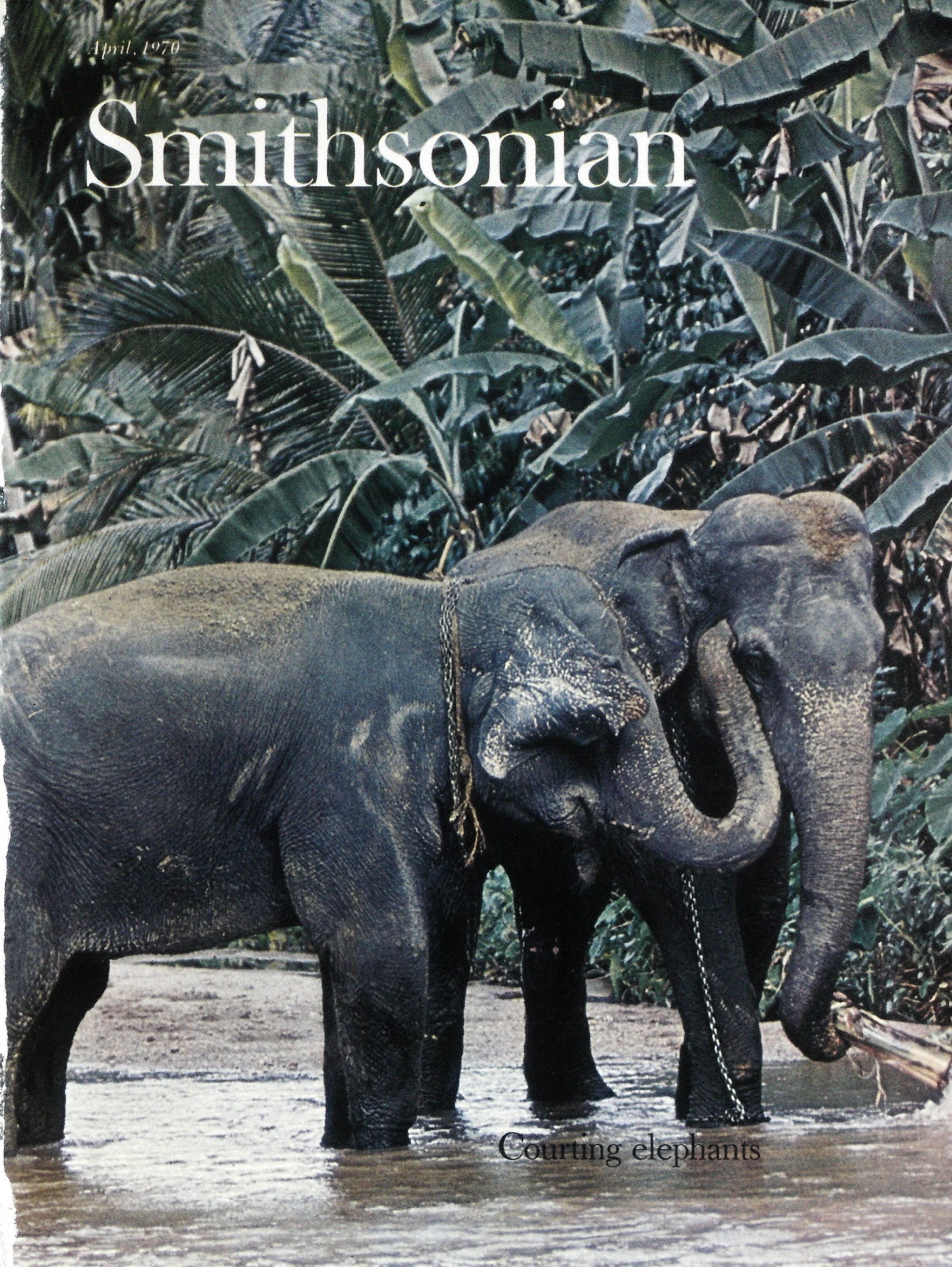
April, 1970

Smithsonian



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April 1970

Smithsonian

Volume 1, Number 1

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SMITHSONIAN is published monthly by the Smithsonian Associates, 900 Jefferson Drive, Washington, D.C. 20560
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Subscription price $10 a year in U. S. and possessions, $11.50 elsewhere.
Application to mail at second-class postage rates is pending at Washington, D.C.
Editorial offices at Arts and Industries Building, 900 Jefferson Drive, Washington, D.C. 20560.
Advertising and circulation offices at 420 Lexington Ave., New York, New York 10017.
Please address all subscription correspondence and change of address information to P. O. Box 404, Flushing, New York, 11378.

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The view from the castle

The towers and turrets of the original Smithsonian building look to the past but, within, all thoughts are on the future

With this first issue of a Smithsonian magazine it is worth reminding ourselves of the origins of our own Institution, which this year is 124 years old.

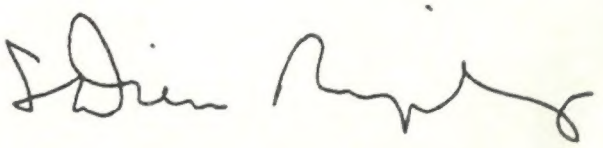
In 1846, by a conscious act of will on the part of a few passionate adherents in Congress, the bequest of the enigmatic Englishman, James Smithson, was finally accepted and the Smithsonian Institution created under the guardianship of the United States. Eight prior years of desultory debate had finally resulted in the setting up of an Institution in Washington "for the increase & diffusion of Knowledge among men," to quote the will of the benefactor. Some legislators had wanted to found an observatory, others a library, a college for teachers, a national university, an agricultural school. In the end, after the Act was passed, Joseph Henry, professor at Princeton, leading scientist of his day, produced the accepted plan. The Smithsonian would exist to support original research in any branch of learning, and to publish reports on the progress of knowledge and on subjects of general interest. As Henry quoted Smithson, "Knowledge should not be viewed as existing in isolated parts, but as a whole. Every portion throws light on all the others."

The urbane and supremely civilized Joseph Henry became the first Secretary, as the director of the Institution is called, and for over 30 years saw to it that the Smithsonian sponsored research in the sciences, history and the arts, and published the results in a way that created worldwide acceptance for American scholarship. Let the Institution *lead* rather than *follow* public opinion, he said, and let the promotion of knowledge exert an influence throughout the world.

Even in the "now" generation, when history has lost its dates, art its roots, when sleep research shows us the absolute necessity of the non-intellective experience, and the new mode is a kind of abstract existentialism, man's thirst for knowledge continues unabated.

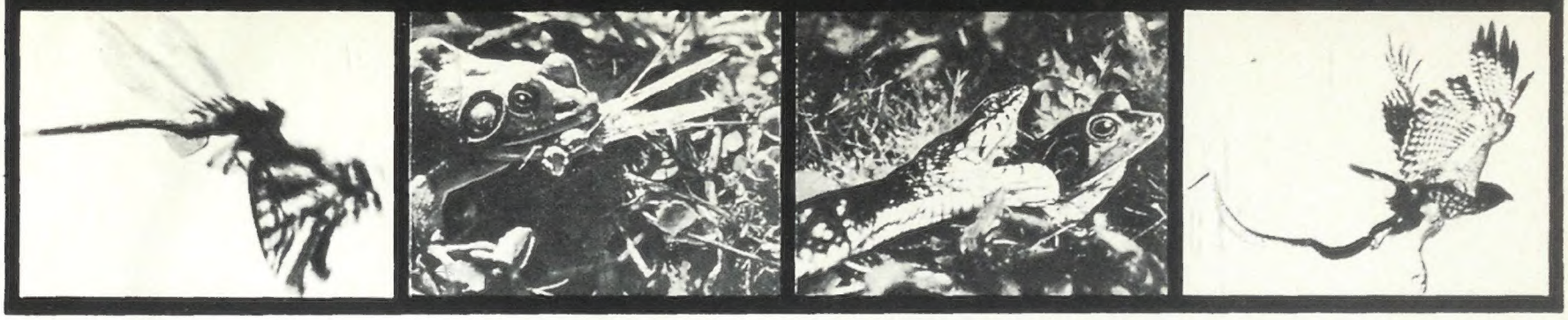
The salvation of the world today lies neither in existentialism nor in economic development, but rather in a subtle blending of applied research—advanced technology, if you will—and humanism. Universities, embedded in their rituals of specialization, are already discovering that the older, traditional academic structures are poorly adapted to the search for new ways of examining the crises which lie in wait for us: the confrontation between the developed minority and the underdeveloped majority, the population surge which simply changes the scale of everything and depreciates old values in a quantum jump, and the relentless environmental deterioration which we are fostering.

The evolution towards a new economy, a new humanism and new approaches to research requires new knowledge set within the context of history—much as a planetarium sets the computation of the past orbits of plants and stars against their present paths—to make us morally certain of our future. It should be the task of our magazine to add to the sum of public knowledge within the mandate of this Institution, for "every portion throws light on all the others" as Smithson asserted in the beginning.



ONE OF THE MANY FOOD CHAINS THAT FASCINATE ECOLOGISTS

1. A dragonfly seizes a butterfly and devours it in mid-air.
2. A bullfrog captures and eats the dragonfly.
3. A water snake surprises the frog and swallows it whole.
4. A hawk flies off with the snake . . . end of a food chain.



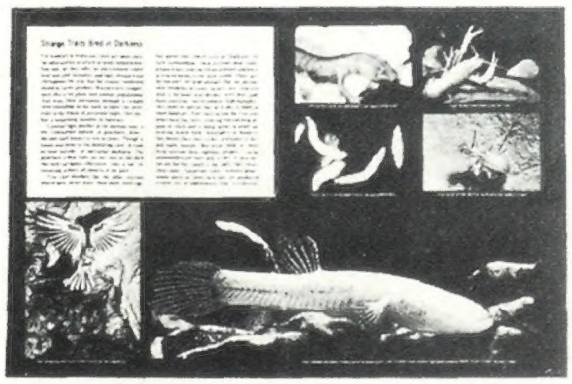
WHY doesn't the kangaroo rat of the southwestern deserts need to drink water?

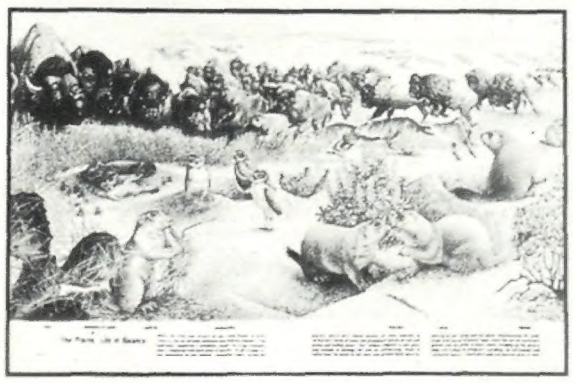
WHY do the frog, crocodile, and hippopotamus have strikingly similar profiles even though they are unrelated?

WHY is the koala bear found only where there are eucalyptus trees?

Now LIFE Nature Library invites you to explore your environment

See through the eyes of the Ecologist the intricate pattern that links life to life, and all living things to earth, water, and air.





Why did the introduction of the potato in Ireland lead to the great famine of 1845? Why does the number of foxes trapped in the Arctic tundra move up and down rhythmically every four years? Why did the introduction of European flora and fauna to New Zealand result in ravaged landscapes?

Tracking down the "why" of nature's seemingly incomprehensible ways . . . unlocking the secrets of cause and effect that link all life on earth . . . is the job of the ecologist. To most people, ecology is a strange new word. But it's a word you'll be hearing more and more in our time. For to scientists, ecology may hold the key to the whole future of life on this planet.

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. . . how the killing of great bison herds started a chain reaction that transformed once-rich plains into deserts.

. . . how the showy water hyacinth, transported from Venezuela to New Orleans, brought river traffic to a standstill.

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"OUR SCRAP HEAPS CAN BE ALUMINUM MINES"

—David P. Reynolds

Aluminum's scrap value makes it worth collecting and "re-cycling"...

There are two national problems which we believe no materials producer should ignore: litter and conservation. Fortunately, because of the nature of our metal, aluminum, Reynolds has been able to develop some answers in both areas.

Indestructible aluminum is re-usable

First, aluminum has scrap value; it is virtually indestructible. It resists corrosion, will not rust. It can be remelted, re-alloyed, and re-used—economically. And the need for and uses of this strong, lightweight metal multiply yearly.

So a used all-aluminum beverage can is worth something; it is worth picking up and "re-cycling." If this suggests a way to fight litter to you, it did to the men at Reynolds, too. We have successfully tested different approaches in Los Angeles and Miami, and plan to add other cities this year.

Using aluminum's scrap value

Our idea is to encourage community groups to sponsor aluminum can collecting drives, and earn money for worthwhile causes and their own needs. As they raise funds, they help keep their streets, parks, and beaches free of litter.

Aluminum scrap does offer a worthwhile incentive to such organizations: a ton of aluminum, for example, brings $200 from dealers, compared with $20 for steel and $16 for waste paper. This scrap value is something many industrial users keep in mind when they specify aluminum equipment. They know there's a bonus waiting at the end of the service life of this equipment.

Mines—not scrap heaps

Although there is an abundant supply of aluminum for the foreseeable future, the fact remains

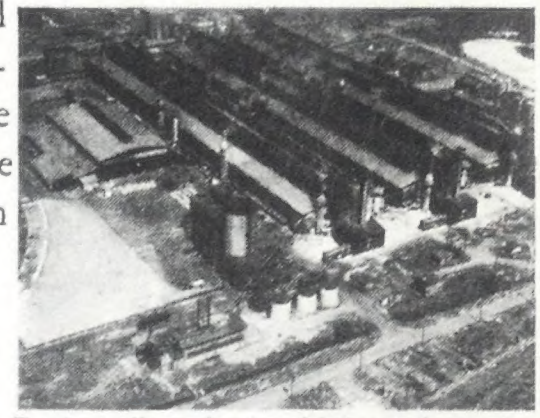
that the supply is not unlimited—and aluminum usage has been doubling roughly every ten years. This need not be a problem if we capitalize on aluminum's re-usability. Already, an estimated 30% of the world's aluminum is reclaimed or secondary metal. This could be even higher.

Countless products provide "mines" of aluminum, ready to be tapped. Not only aluminum cans and packages, but the aluminum in appliances, automobile parts, building products, even railroad cars can and should be reclaimed when they've finished their useful service.

Scouts and many other organizations fight litter and raise money by collecting all-aluminum cans.

New Reynolds reclamation plant

We at the Reynolds Metals Company have launched our effort toward this goal—not only with our anti-litter can collecting programs, but with a major investment in reclamation facilities, as well. (An additional Reynolds reclamation plant will be producing usable aluminum from scrap this year.)



Reclamation plants which produce aluminum from scrap help conserve our natural resources.

Efforts such as these, we believe, will do much to reduce the solid waste disposal problem, and help stretch our natural resources. *Reynolds Metals Company, P. O. Box 2346-LMM, Richmond, Virginia 23218.*

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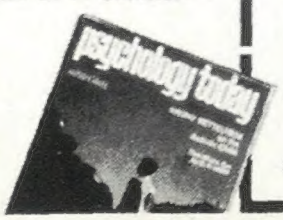

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Drawings by Robert Osborn

"All the elements of nature have evolved and continue to evolve together"

by René Dubos

Life is an endless give-and-take with Earth and all her creatures

If these processes continue, all is well
—but certain aspects of the present
situation have no precedent in history

Our blue planet. Our green planet. It was worth the 21 billion dollars spent on the Apollo missions to make us perceive, through the eyes of the astronauts and with our own eyes, the color and inviting richness of the earth in contrast to the bleakness of space. Now that we have experienced the grayness and drabness of the moon and that the photographs taken by the Mariner spacecrafts have dispelled our illusions about the existence of canals and of life on Mars, we appreciate even more, because we know it to be so unique in the solar system, the sensuous appeal of Earth with her blue atmosphere and her green mantle.

But there is much more to the quality of the earth than the pleasure it gives our senses. Our blue planet is responsible for our very nature because human beings are shaped, biologically and mentally, by the environment in which they develop.

One need not be a learned biologist to understand the large implications of James Baldwin's words: "It means something... to live where one sees space and sky or to live where one sees nothing but rubble. . . ." And: "We take our shape . . . within and against that cage of reality bequeathed us at our birth. . . ." Just try to imagine a child developing on the desolate surface of the moon or on Mars. However favorable his heredity, nutritious his food, comfortable his dwellings, he could never acquire the mental and emotional attributes that we identify with humanness. The earth is our mother not only because she nurtures us now, but even more because our biological and mental being emerged from her during evolutionary times and is constantly maintained and shaped by the stimuli we receive from her during our present existence. We could not long remain true human beings if we were to settle on the moon or on Mars, and we shall progressively lose our humanness if we continue to destroy the unique qualities of the earth by pouring filth into her atmosphere, befouling her soil, lakes and rivers, and disfiguring her landscapes with junkpiles. Man is of the earth, earthy. The quality of his life is inextricably interwoven with the quality of the earth and of the life she harbors.

How Earth transcended her material

Astronomers describe the earth as just another planet, and a minor one at that, with no special distinction among all the countless celestial bodies that gravitate mechanically and perhaps aimlessly through the limitless universe. But this is a view of reality distorted by scientific professionalism. The more interesting and more important truth is that the earth transcended her material and mechanistic nature when she began to harbor life more than two billion years ago. Without life, the earth would indeed be just another drab fragment of the solar system. Fortunately, however, living things have converted the inanimate matter of her crust into a living substance. The sensuous quality of her blue atmosphere and of her green surface derives from the activities of the countless microbes, plants and animals that she has

René Dubos is a microbiologist and experimental pathologist, and a professor at Rockefeller University in New York. He is the author of many books, among them So Human an Animal, *which shared the Pulitzer Prize for nonfiction in 1969.*

nurtured and that have transformed her substance. We human beings exist and enjoy the world only by virtue of the environmental conditions created and maintained by all the other forms of life. The earth is a home suitable for man because her crust is literally a living organism.

All the elements of nature have evolved and continue to evolve together. Living things are transformed by the responses they make to environmental stimuli, and these responses in turn transform the environment which stimulated them. For example, the chemical composition and the physical texture of the soil are determined not only by its mineral basis and by the effects on it of atmospheric conditions, but also by the activities of the microbial, plant, and animal life it harbors. Even more impressive is the fact that the concentrations of oxygen and carbon dioxide that exist today in the earth's atmosphere differ profoundly from those that prevailed before the emergence of life. The present atmosphere owes most of its oxygen and carbon dioxide to biological phenomena that have been going on uninterruptedly since the emergence of life and on which our own life depends today. It is this fact which accounts for the gravity of the persistence and accumulation of the new synthetic pesticides throughout nature, and particularly in the ocean plankton where they interfere with the production of oxygen by microscopic plants.

The benefits of reciprocity

The complex and endless give-and-take between living organisms and the environments in which they function has been described as "cybernetic relationships" or "feedback processes." These phrases apply not only to nature as a whole but also to local situations. Each type of organism selects a special kind of environment in which it creates its own niche and thereby transforms this environment to make it even more suitable to its needs. For example, social bees have an environment that differs from that of solitary insects living in the very same field, in part because they do not use the same kind of local resources, but also because they create their own microclimate inside the beehive (illustration, p. 12). The land under an oak forest differs from that under a pine forest because pine needles do not produce the same kind of humus as do oak leaves.

Under normal conditions most changes that occur as a result of the interplay between a particular organism and its total environment are beneficial to both in the long run. These reciprocal changes account for the exquisite fitness that is often encountered in undisturbed nature and now and then in the works of man, especially when he creates them in close association with nature.

Ancient civilizations all over the world derive much of their appeal from the fitness of their ways of life and of their cultural forms to natural surroundings. One of the charms of travel in old countries is that their buildings, and especially their roofs, vividly reflect the constraints imposed by the climate and by the topographical characteristics of each region. This is true especially for primitive people in economically poor areas. The adobe houses of the Pueblo Indians and the snow houses of Eskimos exhibit ecological fitness just as do the very different types of dwellings evolved centuries ago by the civilizations of the Mediterranean or

Without her living crust, Earth would be . . .

. . . another drab fragment of the solar system

Scandinavia, where prevalence of sun or snow determined biological needs and architectural forms.

In the past, farming communities created, probably in an unconscious manner, environments that were often aesthetically and operationally successful because they were so closely related to the ways of life and therefore to natural conditions. All over the world, some aspects of the landscapes left by ancient societies constitute now their most enduring memorials—as for example the medieval farmlands of Western Europe, the dry stone walls of New England or the terraced mountainsides of Bali.

The diversity and fitness resulting from a continuous series of feedbacks between natural forces, man-made artifacts and human activities generally persisted until the Industrial Revolution. According to the English archaeologist Jacquetta Hawkes, the interplay between the people and the landscape of Britain came close to achieving a desirable equilibrium during the 18th century. In her words, ". . . Men had triumphed, the land was theirs, but had not yet been subjected and outraged. . . . Communications were good enough to bind the country . . . but were not yet so easy as to have destroyed locality and the natural freedom of the individual that remoteness freely gives. Rich men and poor men knew how to use the stuff of their countryside to raise comely buildings and to group them with instinctive grace."

The environmental crisis we are experiencing now is the expression of the fact that fitness can no longer be achieved by the spontaneous processes that were effective in the past. Ecological adjustments cannot keep pace with the disturbances caused in nature by population growth and by the impact of technology. Man cannot adapt rapidly enough, and in many situations cannot adapt at all, to the new surroundings and ways of life he is creating.

The optimist has good historical reasons to justify his confidence that the present environmental crisis will eventually be overcome. Mankind has experienced many similar types of crisis in the past and has taken them in stride. A century ago, the great cities of Europe and America were far more polluted, unsanitary and crowded than they are today. Their inhabitants were plagued with nutritional and infectious diseases such as rickets, tuberculosis or typhoid fever of which the seeds rooted in the dank surroundings and flowered in the polluted air of squalid cities. Human life was made miserable by socially inflicted neuroses of the kind which provided Sigmund Freud with abundant clinical material. Fortunately, many of these organic diseases and neuroses which were so common during the late 19th century have all but disappeared in the Western world, even if they have been replaced by others which constitute the so-called diseases of modern civilization.

Modern life's all-too-solid wastes

Since the resilience of nature and of the human constitution is as great as ever, one can hope that the defects of modern life will be corrected as have been those of the past. Certain aspects of the present situation, however, have no precedent in the history of the earth or of man. As a consequence, it cannot be taken for granted that the self-corrective processes which used to operate in nature and in human life will prove effective in the present crisis.

Two life-styles in the same field

Consider for example the problems posed by the disposal of solid wastes. In the past, solid wastes consisted chiefly of wood, paper, cotton, linen, wool, leather and other organic substances derived from natural sources. When deposited on the earth or thrown into the water, such organic residues were rapidly attacked by microbes and thus eliminated through decomposition. This happened naturally because there exist in water and in the soil a great many different species of microbes that have evolved since the beginning of life in contact with the various types of natural products. All over the world, it has long been the practice to use organic residues as fertilizers, either by spreading them directly on farmlands in the form of so-called night soil or by processing them first in the farmer's manure pile or in the gardener's compost heap, where they undergo microbial decomposition. Microbes, however, have had no prior experience with the new products of industry.

The need to recycle junk

The junk and dirt of primitive societies was and is objectionable, but fortunately it did not accumulate because it was reintegrated into nature through the action of the microbes. In contrast, there is no natural mechanism to decompose and reintegrate into nature —to recycle, as the expression goes—the junk of industrial civilizations. The solid wastes of modern life will continue to accumulate, and soon bury us, unless scientific technology develops ways to destroy the artificial products it creates in such nauseating profusion, or—more usefully—ways to reintroduce them into the economic cycle. The viper of industry must learn to swallow its tail.

In the concentrations used, DDT and related chlorohydrocarbon insecticides possess little toxicity for man and for most animals. However, many of these new synthetic substances not only resist microbial decomposition but are chemically stable. As a result, they accumulate in nature and increase in concentration as they pass from one organism to the other along the food chains. According to recent reports, shrimp from Utah's Great Salt Lake contain DDT in concentrations of seven parts per million; laboratory crabs fed on these shrimp die in an early phase of development. Most shocking of all, the concentration of DDT in the milk of American women now greatly exceeds the maximum level allowed in food products by the U.S. Food and Drug Administration.

The environmental pollution problem has thus taken a very new aspect in consequence of the fact that neither man nor other living forms have had any experience in the course of their evolution with the host of synthetic substances produced by industrial civilization. The microbes present in soil or water cannot develop enzymatic mechanisms to decompose automobile tires, plastic containers, DDT and other synthetics, let alone the bathtubs, washing machines, refrigerators, television sets and other gadgets that are discarded everywhere and disgrace the American landscape. Similarly, there is little if any chance that man will ever develop truly effective biological mechanisms of resistance to automobile exhausts, industrial pollutants and the countless new synthetic products which are now part and parcel of this daily life—yet are so different from the substances he experienced during his evolutionary past.

Microbe vs. new product of industry

Like the problem of environmental pollution, the population problem is now presenting itself under aspects for which there is little precedent in prehistory or history. Despite what is usually believed, however, crowding *per se* is not the new factor. Surprising as it may seem, most cities of the Western world are less densely populated today than they were in the Middle Ages and during the Renaissance, or even a generation ago. The population density in American cities—even in New York—is lower than it is in the cities of continental Europe and Asia. And yet American cities give the impression of being more and more crowded.

Why the crowd seems to be closing in

The painful experience of crowding so common in the prosperous industrial countries comes not from greater population density than in the past, but from the greater impact made on the environment by the modern city dweller. He owns automobiles that emit irritating fumes, create confusion, make unbiological noises, and require ever increasing space in the form of concrete highways and garage facilities. He uses air conditioners which cool his individual dwellings but generate heat for the city as a whole and thereby increase the demand for more air conditioning and for more electric power. And so it goes. Each gadget that saves physical effort, each piece of equipment that adds to the gross comfort of modern life, inevitably increases the impact of the city dweller on his environment and thereby makes crowding more stressful, even though population density is actually decreasing in many urban settlements.

The most publicized effects of the environmental crisis are those influencing the supply of natural resources, and those threatening human health. I shall not consider these effects, not because I doubt or minimize their importance but because they are obvious and have been extensively discussed by scholars in economics, sociology and medicine. I shall instead deal with the more elusive problem posed by the effect of the environmental crisis on the quality of human life.

Before proceeding, however, I must reaffirm my conviction that the human species cannot develop effective biological mechanisms of adaptation to stimuli with which it has had no experience in its evolutionary past—for example, to the pollution of air, water and food with new synthetic chemicals, to the shrill noises of certain technologies, to the sudden changes in human relations resulting from excessively rapid social and geographic mobility. One can expect therefore an increase in the prevalence of the so-called diseases of civilization—those man-made maladies which are caused by our failures to respond successfully to the new environmental stresses of man's own making. Granted these failures, I doubt nevertheless that the threatening ecological crisis will lead to irreversible disasters and to the extinction of mankind. Its more certain effect will be to cause a progressive degradation of the quality of human life.

A legacy of soot and dirt

I shall introduce the subject with a personal experience which certainly has its counterpart in the life of most persons living in the technological world.

I spent my school years in Paris, until the age of 24. At that time, the historic buildings of Paris were dark, covered with black soot. We used to believe that this somber tonality—caused by dirt!—gave antique refine-

"Progressive degradation of the quality of human life"

ment to the Parisian atmosphere. Indeed, there was an outcry of anger when André Malraux proposed that the Paris buildings should be washed. Then a miracle happened. When the soot was removed from 18th-century monuments, their surfaces revealed the golden hue of the building stone, as subtle and warm as young human flesh. For more than a century Parisians, and the rest of the world, had become accustomed to the gloomy mood created by the soot and dirt of the Industrial Revolution. Sensitive life had been impoverished by this conditioning. How I wish now that, as a young boy, I had seen the Gothic cathedrals when they were still white, and the 18th-century buildings when they proudly displayed colorful stones and marbles.

Memories of the dark sooty buildings in the Paris of my youth always come alive when I hear from some of my young friends that they have never seen the Milky Way. They are sensitive and perceptive persons, but have had the misfortune of being born and raised in New York City. Living in an environment which is always polluted, they hardly ever have the opportunity to experience a luminous, vibrant night, a truly blue sky, the intoxicating fragrance of an early spring day, or the poetical melancholy of autumn. Industrial civilization has robbed them of the immensely enjoyable sensations which have heretofore nurtured the desirable attributes of human nature, and which are still as essential as ever for biological and mental health. Biologically, mentally and emotionally, man is still shaped by his environment and depends on it for the satisfaction of his acquired needs.

"Noise, ugliness and garbage in the street"

Experiments with laboratory animals and studies of human populations have demonstrated that biological and mental individuality reflects the influences exerted by environmental stimuli on the developing organism. In scientific jargon, this means that, contrary to what is often believed, genes do not determine all the traits by which we know a person; what they do, rather, is to govern his biological and mental responses to the stimuli that impinge on him. These responses become indelibly inscribed on the body and mind, thus providing patterns which impose a direction on further development. As a result, each one of us is constantly being shaped by his total environment as much as by his genetic endowment.

The environmental influences experienced during the very early phases of development—prenatal as well as early postnatal—have the most profound and lasting effects on the characteristics of the adult. Hence the critical importance of the environment to which the child is exposed, since this determines to a very large extent which parts of his inherited potentialities become activated and the manner in which they develop to shape his adult individuality. The greatest crime committed in American cities may not be murder, rape or robbery, but rather the wholesale and constant exposure of children to noise, ugliness and garbage in the street, thereby conditioning them to accept public squalor as the normal state of affairs and diminishing their future enjoyment of life.

In the preceding paragraph, I have used modern biological jargon to express the common awareness that most human characteristics are the expression of environmental forces. But this truth had been recognized long before the advent of modern science, for example by Greek philosophers and physicians almost three thousand years ago. In a striking passage of his famous treatise on *Airs, Waters and Places,* Hippocrates boldly asserted that the topography and climate of a region are as important as the quality of food and water in determining the physical stature of the inhabitants, as well as their political institutions, military prowess and general behavior. This was written in the 4th century B.C. So ancient is the wisdom which modern scientists now try to restate in formulas and equations.

Ralph Waldo Emerson expressed the same view in other words when he wrote in his essay "Uses of Great Men," published in 1850, "Men resemble their contemporaries even more than their progenitors." We resemble our progenitors because we inherit from them our genetic endowment. But we resemble our contemporaries even more because, within a given country and social group, most members of a given

"America is redolent of loose fits everywhere"

generation are simultaneously exposed during the formative stages of their early life to similar environmental conditions and stimuli. For example, a very general effect of the environment created by the modern world during the past decades had been the acceleration of growth and the earlier sexual maturation among children of the countries that have adopted the ways of Western civilization. Examples of this phenomenon can be observed today in Israel where teen-agers and young adults born and raised under the conditions prevailing in the collective homes of the kibbutzim are bigger than their parents who emigrated from the ghettos of Eastern and Central Europe. Likewise, Japanese teen-agers are much taller than their prewar counterparts, not because they are different genetically but because the conditions of life in postwar Japan differ profoundly from what they used to be. It can be taken for granted that larger size and accelerated sexual development have behavioral consequences that will affect the course of civilization. One may wonder how a population of tall and husky Japanese can function happily and effectively within the exquisite daintiness of the kind of architecture and landscaping that characterized traditional Japan.

Japan provides one of the many illustrations in the preindustrial but civilized world of the development of fitness between man and his total environment. The very word *Nippon* evokes a wonderfully integrated composition of natural scenery and climate, humanized landscape and architecture, formal ways of life and functionally elegant furniture. Such fitness could hardly be achieved through conscious design. It must have developed more or less spontaneously in the course of the slow interplay between man and his total environment.

All over the world in the preindustrial era, tools, architectural forms and social structures exhibited a high degree of fitness not so much as a result of conscious design as because the very process of inventing and building involved a slow, continuous and highly personal contact between man and his creations. Since the problems that had to be dealt with were usually rather simple, only limited knowledge was needed to create artifacts or institutions well suited to the needs. Then, tradition and the almost unconscious response to new needs maintained the fit as culture evolved and became more complex.

A formula for a contented life

In Southern China, it has long been a custom to select village sites according to the doctrine known as *fêng shui,* wind and water. It teaches that buildings should be located in such a way as to be protected against storms and floods, exposed to warmth and attractive views, and readily accessible to farmlands, streams, and groves of trees. What better formula could there be for a contented life? And why should it surprise us to learn from Bernard Rudofsky in *Architecture without Architects* that the architecture of preindustrial people is often better than our own?

It is easy to imagine how accidental influences determined at the beginning certain choices and courses of action which were largely intuitive and even subconscious, because the purpose to be fulfilled was not clearly defined and the goals to be reached were uncertain. Desire for a certain form of worship, the needs of collective life, or simply the search for comfort and safety, evoked responses that were organic rather than cerebral in nature. The body made the decision, as it were, and the mind followed. Local opportunities determined the slight bias in techniques, forms and attitudes which was at the origin of the process. And as time went on, this bias progressively became more con-

"The belief that man has conquered nature"

scious and more strongly expressed, evolving into better-defined standards of beliefs, behavior and tastes.

In modern societies, however, technological and social innovations are so numerous, extensive and rapid that they do not provide the conditions or the time for the spontaneous adaptive processes that used to be so effective in the past. This has been especially striking in the United States since the 19th century, for the simple reason that growth and change then became dominant criteria in the American way of life.

Sixty years ago William James wrote to C. A. Strong: "*Tight fit* is what shapes things definitely; with a loose fit you get no results, and America is redolent of loose fits everywhere." At least two different kinds of reason may account for this lack of fitness in America life. One is that the massive and virtually uninterrupted waves of immigration during the past century made it extremely difficult for most of these people to become rapidly and completely identified with the environments, often entirely new to them, that they found in their country of adoption. Around the turn of the century, a large percentage of Americans had no deep roots in the American soil. Another reason is that technology developed faster and to a greater extent in the United States than in other countries, thus making it more difficult than elsewhere for the adaptive processes which generate fitness to keep pace with the rate of change.

Now that social and technological changes are too rapid for the spontaneous development of successful adaptive responses, modern societies will have to depend on conscious design for the achievement of fitness. I prefer to speak of "design" rather than "planning" because I want to emphasize the need to create social and ecological patterns in which the potentialities of persons and places can achieve expressions that are humanly desirable.

We belong to a generation which has been brainwashed into the belief that man has conquered nature and can transform it for his own purposes in any way he pleases. But this formula inevitably leads to degradation of the environment and to the destruction of human values. In reality, each place has its own peculiarities, which limit the range of what can be safely done with it and which indeed determine the kinds of successful expressions it can achieve. One could almost say that places, like persons, are well suited to only a very few tasks.

The belief that places have a calling—a vocation as it were—is probably as ancient as mankind. At least from the beginning of recorded time, people of all races in all parts of the world have imagined that each particular place or region is endowed with a "genius" or "spirit" which they commonly personified by a god or goddess. We have not outgrown this belief. Agnostic as we may be, and scornful of any thought that there is a ghost in the machine, we still know deep in our hearts that there is pragmatic truth in expressions such as "the genius of New England" or the "spirit of the Far West." Who can doubt that Naples and New York each have their own *genius loci,* which will make them and their inhabitants evolve differently irrespective of technological standardization?

As used in the classical phrase *"genius loci,"* the word genius does not denote gifts or achievements of a superior quality, but rather a special array of attri-

butes—including limitations as well as potentialities—that accounts for the uniqueness of each particular place or region. Design can be lastingly successful only if it takes these attributes into consideration. As Horace Walpole wrote after returning from a trip to France, ". . . They can never have as beautiful landscapes as ours, till they have as bad a climate."

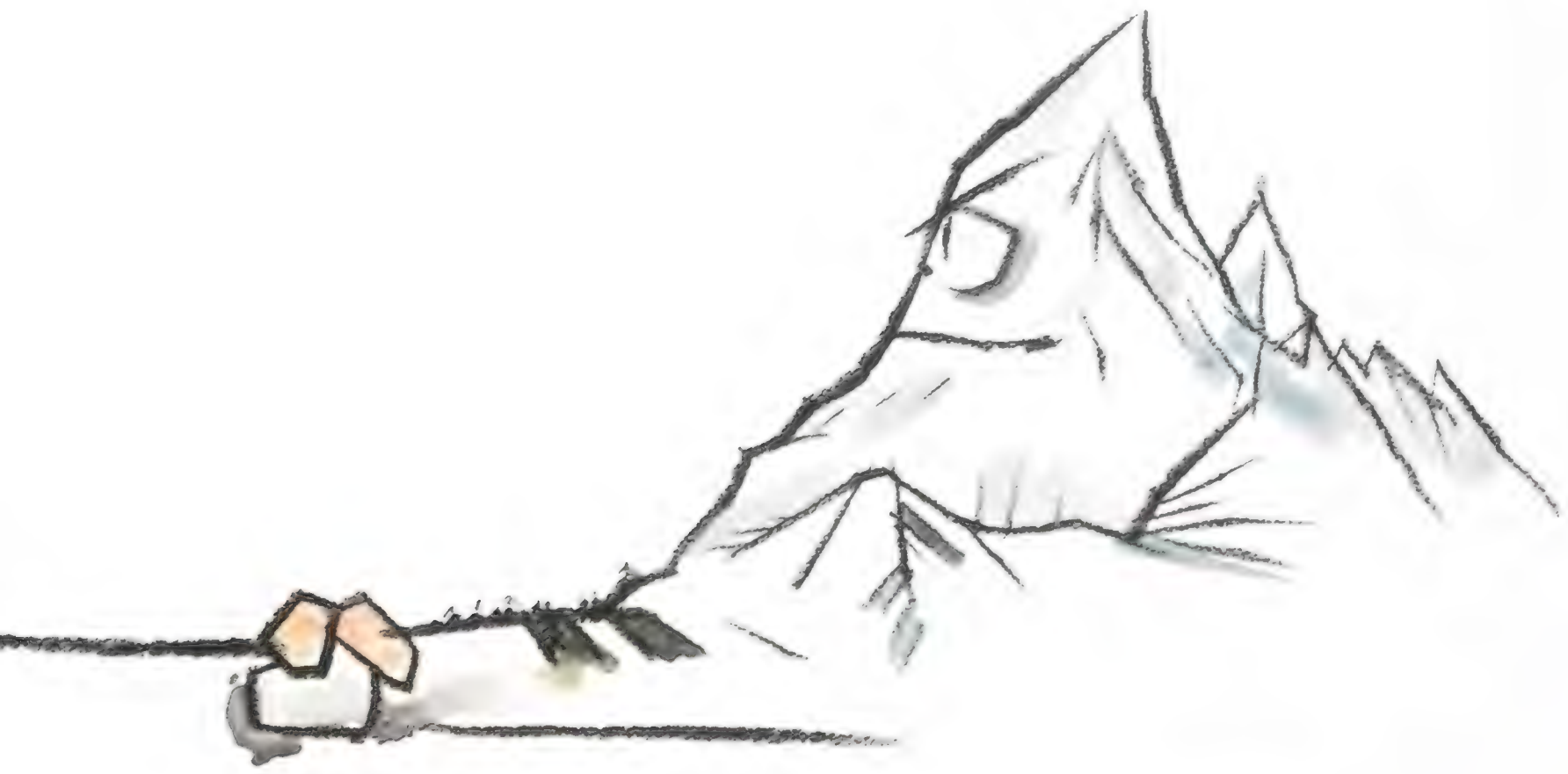
Progress in a civilized world

Human beings are so adaptable that they can survive, function and multiply despite malnutrition, environmental pollution, excessive sensory stimuli, ugliness and boredom, or high population density and its attendant regimentation. But while biological adaptability is an asset for the survival of *Homo sapiens* considered as a biological species, it can undermine the attributes that make human life different from animal life. From the human point of view, the success of adaptation must be judged in terms of values peculiar to man. The cultivation of these values does not imply a retreat from civilized life, but it will require a change of emphasis in economic and technological enterprise, which is quite within our present capacities. Progress should not mean, as it does now, doing faster and faster on an ever increasing scale what we are already doing. In a truly civilized world, progress will mean a social design in which the economic and technological effort will be focused on the creation of the environmental values best suited to the development of human potentialities. These values cannot be dissociated from the qualities of the earth.

The enchanting diversity of Earth comes from the multiplicity of the living forms she harbors, each fitted to a particular place and contributing to its genius. Although modern man has placed himself somewhat outside natural systems, he can and should play a creative role in the achievement of fitness by substituting for the contemporary doctrines of conquest and exploitation, a philosophy of conscious design based on ecological knowledge which will eventually lead to a theology of the earth.

Landscapes and civilizations emerge from the interplay between external nature and man's nature. And so do human individualities. We shall be successful in shaping the world around us, and in advancing the human condition, only if we learn to integrate our unchangeable biological nature with the natural forces and living forms which together constitute the *genius loci.* Man's daily life and his aspirations cannot be thought of apart from natural events because they are the ultimate expressions of our living Earth.

This is the first in a series of articles on Man's relationship to his environment. In the next issue Senator Henry M. Jackson, author of the National Environmental Policy Act of 1969, will write about legislative priorities.



Man and nature reconciled

Exploring the structure of the ocean's floor with a towed transducer, aboard a research vessel of the Scripps Institution of Oceanography, University of California.

He studies the secret life of an old friend.

Can we learn enough about the sea to conserve its resources for future generations? Oceanographers like Ed Coughran believe we can. His story is another example of how IBM, its people or products often play a part in tackling today's problems.

"With on-board computers, we can analyze results instantly, and continue the experiment while still at sea."

"For centuries, the oceans have been a good friend to man," says IBM oceanographer Coughran. "They have been his highway, hunting ground, playground and, unfortunately, his battleground and dumping ground. The job of the oceanographer is to try to understand the oceans better and to add his information to the existing body of marine knowledge.

"We still need to learn much more about the sea in order to insure long lasting use of its resources. How do temperature changes affect marine plant and animal life? How do the deep waters, below the level that man can see, replenish life in the ocean? How long can fish and other marine life continue to live with the debris we pump into the sea?

"The bits of information we collect require thousands of calculations before conclusions about them can be made. And so we run them through our seagoing computers. What oceanographers hope to do with the help of computers is build a mathematical picture of the oceans themselves, to predict their future behavior.

"The seas give up their secrets grudgingly, challenging men to get what they can. But this is the kind of challenge I like. It may take many more years of work to get the answers to our questions. But when we do, we'll know how to use the sea in a way which will preserve its resources for generations to come."

IBM®

by John F. Eisenberg

Breeding project helps restore Ceylon elephants

Smithsonian expedition studies the ecology of Ceylon's diminishing wild herds and takes a census of island elephants

At least two, perhaps five, cow elephants are now carrying what will be the first calves from controlled breeding in captivity on the island of Ceylon (see cover). Meanwhile the Ceylonese government is planning to provide better ranges and water supplies for wild elephant herds. These two developments may save the Ceylonese elephant, which is culturally, economically and religiously important. Its numbers have dwindled in the past four centuries from an estimated 40,000 to fewer than 3,000.

Because of this threat of extinction to its elephants, the Ceylonese government invited the Smithsonian Institution to survey the wild herds. Lands that used to be theirs have been taken for cultivation, and ignorance of elephant habits and needs has prevented appropriate land allotments in national parks and wilderness areas.

Moreover, the rounding up of wild elephants to replace domestic elephants has now been forbidden in order to preserve the wild herds. Thus the population of domestic animals has also been declining—only 453 by the latest census—and their average age exceeds 25. Owners and mahouts have been avoiding controlled breeding of captive animals on the theory that the males would become unmanageable and lose their vigor and health after mating and that a pregnant female could not do heavy work.

Ceylonese wild elephants cluster defensively, young between cows, at the intrusion of Smithsonian census takers. The animals browse in an old irrigation area, now vividly green.

The members of the Smithsonian expedition feel that many of these dangers are being removed. The wild herds are getting better living conditions. And we know that controlled breeding can replenish captive stock.

In the early years of Ceylon's agricultural settlement, perhaps 13 centuries ago, farmers from the Indian mainland colonized the lowland dry zone and forced the elephant to both lowland and highland wet zones. Only with the decline of lowland cultivation did the elephant reinvade many parts of its former dry-zone range. Then the British and Dutch, in the 19th century, introduced intensive crop cultivation, which drove the elephant from the lowland wet zone and

The author is resident scientist at the National Zoological Park, Washington. He directed the Smithsonian expedition in Ceylon, acting as 'Elephant Master' before dubious mahouts.

the highlands where the great animals had ranged for so long.

Recent plans to make Ceylon agriculturally self-sufficient have brought more and more areas under cultivation. A 1950 survey by the Wildlife Protection Society of Ceylon showed that the plight of the last remaining wild elephants was critical.

In 1966 the Ceylonese government asked Helmut K. Buechner, chief ecologist at the Smithsonian Institution, to coordinate a survey of Ceylonese elephants. The Institution sent John A. King of Michigan State University to make a preliminary report. On its basis, Buechner, Raymond Fosberg and I, all of the Smithsonian, planned a comprehensive study of the island's three national parks and adjoining wilderness areas. Survey operations were divided among three investigators, Fred Kurt of Switzerland, George McKay, a Canadian at the University of Maryland, and myself. Studies began in 1967 and continued until last December. We worked from permanent camp shelters set up with native materials and indigenous architectural methods.

The Ceylon elephants are not easy to study because most of the park areas are covered with dense vegetation—forest and scrub. Less than ten percent is open or savanna-like, and such grasslands are mainly around water holes. In such terrain elephants can virtually disappear before your eyes, and in Gal Oya and Wilpattu parks (see map), where elephants are quite shy, periods of direct observation are often limited to late afternoon or very early morning hours. Only in Ruhunu Park do certain of the elephant herds feed in the open for protracted periods thus permitting longer observations. So to count and even locate elephants, we supplemented observation by such ancient arts as tracking. All members of our survey group had to adapt themselves to the novel terrain and train themselves with the aid of Ceylonese trackers to "read elephant sign."

We knew something of the impact an elephant has on its range. An adult averages from 6,500 to 9,000 pounds. The average height of cows is about seven-and-a-half feet; bulls may reach nine feet. An adult animal may consume as much as 400 pounds of wet food a day, and, indeed, much of the animal's activity is feeding. Typically, adult bulls are solitary. They are interested in the females only at mating time and in the young not at all. Sometimes they are accompanied by one or two younger bulls as satellites.

Oldest cow leads herd

Cow herds include 12 to 25 individuals of varying ages and must move farther than males to find protein-rich foods that they need during the 22-month gestation period and six to ten months of heavy lactation. A cow herd, split into subgroups generally of one

Ceylon: Dark areas are national parks. Bordering lands (lighter shades) are protected somewhat.

adult female and her juvenile offspring, is led by its oldest cow. The subgroups of a herd assemble and feed at preferred locations and leave traces that can be detected easily.

An elephant prefers certain tree and shrub species, shifting its preferences throughout the annual cycle. We tabulated the choices of certain parts of plants and the relative consumption of different grass species.

By mapping, we could ascertain the traditional elephant routes within park boundaries throughout the year. As we learned how the animals moved, we learned to predict where they would be. Thus we could wait at preferred water holes and feeding areas and observe the herds as they emerged into the open in late afternoon for feeding and drinking.

Water holes are also used for bathing. The elephants spray water on their bodies and lie in the mud plastering their hides with a protective coating. They rub against trees in the vicinity of water holes, and often younger bulls will scour the bark with their tusks at the highest point they can reach. Frequently they push over small trees. In extreme drought, this allows them to feed upon the branches or roots.

Where tracks of a herd were plainly visible, we could measure the forefeet and so deduce the height of the animal at the shoulder. Since an elephant's growth is quite predictable we could assign age distributions based on the track measurements, without seeing the animals. Eventually we came to know the herds and understand their movement patterns so well that by counting tracks we could estimate which subgroup of a main herd we were dealing with.

These animals are secretive, and as many as 15 can hide in a two- or three-acre copse in daylight. Yet even in unfamiliar areas we found we could establish the presence of elephants and deduce their sizes and their approximate ages by tracking. In areas abutting cultivation, elephants are even shyer, but they do try to come back to former feeding grounds that are newly cultivated, and they will invade cultivated areas when they are hard pressed for food. In such places most of the elephants' activity in the open is carried out under the protection of darkness.

When caught out in the open and threatened, elephants may flee or attack. An attack generally involves an extended charge by an older adult, sometimes with a low trumpeting. At the moment before impact, it curls its trunk and kicks with its feet. When the animals are disturbed by a man or a vehicle, they may form a cluster: The adults all turn toward the source of danger, scenting or threatening, while the younger animals align themselves between or behind the adults. Any small individual that attempts to move out is quickly restrained by the protective trunk of an older one.

During the drought season the animals' movements are strictly regulated by the availability of water. Elephants use even small water holes if they are not contaminated by buffalo herds. During the rainy sea-

son there may be regular shifts in the intensity of activity to low-lying areas that accumulate water and support a fresh growth of tall grass.

By tracking we could discern the number of animals in a herd at crossing points in the terrain. Our counts on Ceylon have shown that there are about 16 adult males and 40 adult females per 100 animals.

This ratio of males to females is curious. Since males about equal females at birth, it shows that at some stage mortality among them is much higher than among females. Males suffer the highest death rate at puberty—eight to ten years old. At this time the younger males wander away from the cow herds. Raiding plantations, they are vulnerable to man. They are not as circumspect as the cows and when they appear alone or in pairs, the chances are good that they will be hit with a shotgun blast from the villager defending his fields. We noted three cases of wounded elephants, all males, during our year's survey in Wilpattu Park. Each of these elephants had accumulated a series of wounds from shotguns fired at close range. From such an accumulation, they may eventually die with extensive, infected sores.

We tried to clarify movements of individuals within the parks by marking them. Using tranquilizer guns, we managed to immobilize and mark only three elephants. Twice our men had hair-raising escapes during this dangerous procedure when they injected too small a dose and were charged.

Breeding of captives contemplated

Even while checking the wild herds, we had been intrigued with the idea of trying to breed captive elephants. The project had many possibilities. Besides maintaining the population of domesticated animals it could increase the number of tuskers.

The percentage of males bearing tusks in the wild population is only about ten percent, perhaps because of selective ivory hunting. A controlled breeding program could elucidate tusk genetics and produce more tuskers for logging and ceremony.

In the fall of 1968, I became involved with M. R. Jainudeen and J. B. Jayasinghe of the veterinary faculty at the University of Ceylon at Peradeniya in inaugurating a controlled breeding program. Although P. E. P. Deraniyagala records several instances of captive births in a 1955 publication, invariably the breeding was accidental, or the female was already pregnant when caught wild. No *controlled* breeding program had been carried out recently on Ceylon. Breeding elephants in southern India and Burma is generally accomplished through an uncontrolled program. Females are hobbled and left to wander in the jungle. Wild males breed them.

In addition to their fears that breeding elephants lose vigor, mahouts have long speculated that a male would not breed a female unless he were in the state of aggression called *musth*. This is a regular annual or biannual period in the adult male elephant over 15 years old. It lasts an average of from two to eight weeks in captivity and may be equivalent to rut in deer. During this period the male attempts to seek out cow herds for mating. He secretes heavily from a gland midway between the eye and ear opening. The secretion flows down the sides of the face to the corners of the mouth. He rubs it upon trees and marks mud-bathing spots with it. Females sniff at it, and the male will attempt to breed an estrous cow (one that is in heat) whenever a cow herd comes within his home range. He may even accompany a cow herd during some of its travels.

Immobilized with a shot of tranquilizer,
this bull elephant awaits marking
so his movements can be
watched, his range pinpointed.

Shackled in close proximity, two females and a male begin preliminary selection.

Some mahouts claimed that the male would breed only if *not* in *musth*. Our own hypothesis was that males in *musth* are in an active sexual phase and should be allowed to breed. But since the *musth* male is hard to handle, we felt it prudent to conduct our experiments with males in *premusth*. This condition lasts several weeks with minimal secretion from the temporal glands preceding the full secretion.

The mahouts were also concerned that if the male were allowed to breed early, he would not come into normal *musth*—in their view a necessary purging of the system. To convince them, we inaugurated a breeding program and demonstrated that a male did not lose his strength after mating and furthermore that he would come into normal *musth* regardless of whether he bred females or not. These things we accomplished only after a long period of persuasion with a sympathetic owner and several dubious but interested mahouts.

According to a mahout's interpretation of elephant physiology, the animal swallows his own *musth* secretion, which is then recycled in his body. The secretions are considered to be related to the vital essences of the animal's body and so must be reingested.

Indeed during the initial phases of the experimentation, I myself had to be billed as a sort of "elephant master" who when present could guarantee that no unfortunate incidents would occur. Gradually as our breeding program developed, the mahouts gained confidence and came to discard their old belief that breeding bulls lose strength. Many now feel that the elephant can be bred as easily as any other domestic animal.

I will not forget the first time that our initial male successfully mated with a female. Immediately afterward, a boulder was placed in a net bag for him to lift. The mahout was at first worried that he would not be able to control the male, then found that he could make him obey. As the male proceeded toward the rock, great anticipation arose in the observers. The male knelt, grasped the rope handle of the basket in his mouth and lifted the load—much to everyone's satisfaction (see p. 25).

Another breeding problem was to determine the female's estrous cycle. We could find nothing to read on the subject, so we established a technique for obtaining vaginal smears. Utilizing a long pipette, we were able to extract secretions and subject them to staining and microscopic examination. We found that the female did show the usual cell changes to indicate the time of receptivity. Her estrous cycle has a 24- to 28-day period. She is in heat for approximately five days and is maximally receptive during the last two days. We believe ovulation takes place during this terminal period. It is then that a male will attempt to breed her.

To investigate breeding habits we assembled a male elephant and two females, and after bringing them to the river during the early morning, we chained them individually near the river bank. The females were ordered to lie down, vaginal smears were taken, and then an individual female was released to interact with the male. By observing daily throughout a month, we established the correlation between the female's receptivity and the increased cornification of her vaginal cells. The male elephant apparently determines estrus of the female by smell.

Successful mating causes disbelief

Mating is preceded by courtship. The male generally places his trunk over the female's body, and as she moves ahead, he follows, and the mating occurs. Intromission is as brief as 15 seconds in duration and does not always result in ejaculation. When the female is in estrus, the male may copulate three or four times within a two-hour period. The pattern of events correlates well with our observations of elephants mating in the wild.

Elephant owners and mahouts showed a great deal of interest in our experiments. They shook their heads in disbelief at our photographs. In one case a mahout insisted that these were not tame elephants but wild ones. Nevertheless doubts are being dispelled as more and more mahouts and elephants are involved in the breeding program on Ceylon. The stir in the local newspapers was gratifying, and the usual series of letters to the editor carried notifications of previous instances of elephant breeding that heretofore had not been reported. It was especially amusing to note that many elephant owners began to claim that they had already done it but had been reluctant to an-

Trunks entwine as courting progresses.
Male, at left, has small tusks.

Now the bull drapes his trunk over a cow
as a prelude to the act of mating.

Immediately after mating the bull starts to lift a heavy rock slab, confounding a belief that his strength would wane.

Born free, a wild herd grazes through a lush meadow in a Ceylonese park. Elephants need more range land like this.

nounce the event publicly; however, contrary to our two definite successes, in none of the backyard breeding attempts did a pregnancy occur.

Our survey has given an adequate census of park populations and good estimates of those outside the parks. In addition to the 453 captive elephants Ceylon has 700 in parks and reserves and a few more than 1,500 in wilderness areas. About ten percent are calves less than a year old. With new information about movement patterns, feeding preferences and water dependency, we have recommended that the west sanctuary of Wilpattu National Park be included in the park proper and, furthermore, that certain former intermediate zones bounding on Ruhunu Park and Wilpattu be made official parts of the parks themselves.

Park expansion now planned

When we initiated the study, the national parks were almost too small to support large numbers of elephants. Upon our recommendations and on their own initiative, the Ceylonese government has plans to expand the parks. New water holes are being established within the parks by repairing former dams of ancient irrigation sites. We have recommended that wells be dug and windmills installed to provide drinking water in those park areas that are far distant from permanent water sources.

The lower portion of the Mahaveli Ganga basin holds about 500 elephants. Here intensive agricultural development is planned. A nearby zone of partial protection is not big enough to sustain this elephant population. Despite the increasing need to grow food for humans, part of this watershed should be set aside as a national park. It would be a pity indeed to see this, the last of the large wild herds, disappear when these 500 animals eventually come into conflict with the interests of the cultivators. Perhaps, though, it will not happen.

Our elephant study has stimulated the inauguration of an ecology course at the University of Ceylon. Now students working toward degrees in ecology join the government and other Ceylonese in concern for the elephants that have been part of island life for generations.

There is reason to hope that this new awareness, combined with more such studies as we have been conducting, can ensure an orderly development of a national park system and save the great wild herds. Meanwhile, better ranges will conserve the park animals, and captive breeding will replenish the domestic stock.

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Olin

by Jon N. Weber

Coral killer puzzles science

The Pacific's crown-of-thorns sea star is a scourge, but possibly only a transient pest. Here at last is an appraisal, pro and con

Man, long familiar with pestilence and natural catastrophe, now faces perhaps the most unusual plague of this century. Populations of a large, coral-eating starfish are increasing at a phenomenal rate in tropical seas thousands of miles apart. Scientists find no precedent nor can they agree on a reason for these spontaneous infestations. Yet if the starfish plague continues, some experts predict that eventually entire coral reefs may crumble from wave action and disappear, endangering the island homes of hundreds of thousands of people.

The villain of the piece is a sea star, *Acanthaster planci,* commonly called the "crown-of-thorns." Science has recognized it since the 18th century—a reef dweller distributed throughout the tropical Pacific region. But it was so rare that little is now known of its life history.

Acanthaster is a reddish creature, its many arms covered with long spines that are venomous but not normally fatal to humans. One of the larger samples at the Smithsonian Institution has 16 arms and an 18-inch diameter. Some grow almost two feet across.

The starfish moves over reefs, ranging as far as 820 feet in a week. Usually feeding at night, it turns its stomach inside out upon the live coral. Its enzymes digest the living tissue. When the sea star closes its stomach after assimilating its meal, the coral skeleton stands stark, white and bare. Like land recovering from a fire, the reefs may get new corals and in two or three decades recover. On the other hand the infestations may get worse.

Among the many organisms that make up the coral reef community, none has *Acanthaster's* potential for destroying the environment. The stony corals that construct the massive framework of a reef have a number of predators, yet, normally, their damage to the reef is slight and quickly repaired. *Acanthaster,* however, feeds exclusively on coral tissue. Voraciously, these starfish may surge over a large area, rapidly killing all the reef-building coral.

The author is an associate professor at Pennsylvania State University. He has studied and photographed the crown-of-thorns starfish on five expeditions, including the Great Barrier and Guam. He has a PhD in biogeochemistry.

White coral skeletons mark the wake of sea stars as they ooze across a Guam reef, feeding on green living polyps, right.

Serious ecological changes follow the mass mortality of coral. Atoll islands, which have a substrate consisting largely of coral sand and gravel rise only a few feet above mean sea level. It takes enormous quantities of calcium carbonate deposited by reef organisms, to maintain them at their present elevations. Without these deposits they would eventually be swamped by the ocean, for sea level is slowly rising as the remains of the great Pleistocene ice caps melt.

The first outbreak of the starfish plague occurred at Green Island, a popular tourist resort on Australia's 1,250-mile long Barrier Reef. In 1960 a single large crown-of-thorns was found on the southern tip of the

Crown-of-thorns, just under the surface at Guam, measured 12 inches. Adults grow 9 to 21 arms.

Green Island reef. Around the starfish lay circular patches of dead coral, conspicuous because the pure white skeletons contrasted sharply with the brilliant color of the living coral. No one realized until some time later that *Acanthaster* had eaten the coral polyps.

More scars on the reef appeared during the following year; the area over which they were found increased. In 1963-64 visitors in glass-bottomed boats saw tens of thousands of adult starfish moving slowly across the reef. By this time the implications of the infestation were clearly evident. Without a drastic attempt to annihilate the spreading starfish population, all of the valuable coral of the island would be killed within a short time.

Dr. Robert Endean of the University of Queensland reports that in July 1966, 5,750 starfish were counted on the reef flat in 100 minutes. By 1967, 80 percent of the coral colonies of the reef had been killed. The fight to save the coral of Green Island was lost.

Threat seen to entire Barrier Reef

Today, along a 50-mile stretch of the Barrier, running offshore between the towns of Cairns and Innisfail, *Acanthaster* has infested at least 40 separate reefs. This may seem a small fraction of the more than 1,000 reefs that compose the Great Barrier complex, but there is widespread concern that the entire chain of reefs will eventually be affected.

Though so far no true infestation has developed outside the Cairns-to-Innisfail region, new *Acanthaster* populations have appeared at other islands in the Great Barrier.

A second sea-star invasion took place late in 1966 at the U.S. territory of Guam, nearly 2,000 miles north of Green Island. On portions of Guam's fringing reef the starfish population reached a density of one per square yard. On the average, each starfish in the infested area was killing a patch of coral about the size of a bridge table every day.

On December 15, 1968, 47 divers, competing in an island-wide "sea-star tournament," captured 885 animals. Dr. Richard Chesher, chief scientist of a recent Westinghouse Ocean Research Laboratory study, reported that these starfish could have devoured more than five acres of living coral per year.

The devastation on the reefs of Guam resembles that of Green Island. Since 1967 the starfish have killed more than 90 percent of the coral along 24 miles

Green Island, on Australia's Barrier Reef,
has lured tourists to view its coral.
Now the formations are dead. Regrowths may not
reach former luxuriance for 20 to 30 years.

Know your enemies.

Number of Americans killed in various kinds of violence.

YEAR	MURDERS	VIETNAM	DRUNK DRIVERS
1967	12,090	9,378	23,600
1968	13,650	14,592	25,000
1969 EST.	15,000	9,365	35,000

Know the score.

While Vietnam and murders have understandably been making the headlines, another enemy has been killing more Americans than all of them combined. The drunk driver.

Don't misunderstand: this enemy is not someone who's just been drinking, but the *drunk* driver. The man who has so much alcohol in his bloodstream that the best minds in medicine and traffic safety say he shouldn't be allowed behind the wheel of a car.

Each year this menace has been killing and maiming a larger number of people on our highways. The deadly trend can be reversed, however, with your help.

For instance, if your state is one of the 26 that still does not have drunk-driving laws that meet the standards of the National Highway Safety Bureau, you can help get legislation on the books. If your state has the laws, there are simple things you can do to get them working, fairly and strictly. ***Help stop the traffic slaughter.*** Things you can do to help cut the killing are outlined in Allstate's free booklet, "Drunk Drivers and Highway Safety." Write the Safety Director, Allstate Insurance Company, Northbrook, Illinois 60062.

Allstate®

Acanthaster displays its coral-eating stomach
on an aquarium wall at Wrightsville Laboratory, N.C.
A squirt of coral washings stimulates
the stomach to evert as though feeding on a reef.

of coastline. No part of the reef, from low-tide level down to a 200-foot-depth, the limit of coral growth, has escaped damage.

Equally alarming reports come from other areas of the Pacific, including Saipan, Palau, Fiji, Rota, Tinian, New Guinea and the Solomon Islands; the sea star, once rare, is now fairly common. Are *Acanthaster* populations building up to a general epidemic that will leave no islands untouched? Or, on the other hand, could our new awareness of its presence be due simply to better observations as more skin divers, more tourists and more glass-bottomed boats visit regions that used to be remote and inaccessible? Though these questions are hard to answer, Ralph Brauer, director of the Wrightsville Marine Bio-medical Laboratory in Wilmington, North Carolina, sees clear evidence of a starfish plague:

"The attacks are occurring throughout the Pacific, into the Indian Ocean, and almost to the coast of east Africa. It appears that all of the tropical reefs of the Pacific area are in real danger."

We have many theories as to what precipitated the outbreaks at Guam and on the Great Barrier Reef. Many animals are known to undergo cyclic variations in population density, but, if this is the answer to the population explosions, it is difficult to imagine how such an ecological disturbance could remain unobserved and unrecorded had it occurred before.

Another theory is that starfish have recently been freed of predator pressure—that organisms which previously preyed on *Acanthaster* are no longer maintaining a normal ecological balance. Although the breeding season is only about one month per year, a female *Acanthaster* at least two years old can produce as many as 24 million eggs. Fertilization takes place in seawater, and the surviving young develop into planktonic larvae and settle to the bottom. There they face many predators, including the carnivorous coral polyps—the same animals which later fall prey to the adult *Acanthaster.*

Queensland's Dr. Endean believes the mortality rate of the larvae has not changed. He thinks a predator of the larger juveniles and adults has disappeared. However, no one knew what the predators were at the time of the infestations. Because of the noxious toxin of the spines, it is difficult to predict what animal might like to eat it. Experiments sought to identify a potential predator. Large fish, turtles, carnivorous mollusks and crabs were in turn caged with adult starfish, but Dr. Endean found that only one animal attacked *Acanthaster* under these conditions—the giant triton *Charonia tritonis,* a large mollusk in the western Pacific.

Experimenters watched the triton pin a starfish to the bottom with the outer lip of its shell, holding it while sharp teeth of its tongue-like radula cut the vic-

Armed with a hot-water bottle of Formalin, Beth Smaltz, University of Guam's only woman starfish killer, braves poison spines in her bikini. Injection is lethal to the sea star.

tim into pieces. In this manner a large triton could consume one adult *Acanthaster* in 12 to 24 hours. The venomous spines were usually regurgitated.

Dr. Endean's discovery of this predator-prey relation has been substantiated by observations. Eight triton specimens collected on a starfish-infested reef near Innisfail disgorged particles of *Acanthaster.* When 15 adult tritons were enclosed with a population of 100 adult sea stars in a cage on the reef, each triton, on the average, consumed a starfish a week.

Tritons seem to decrease

But the giant triton is not especially common, and there is no evidence that the triton populations are increasing on the infested Australian reefs in response to the large increase of their food supply. They may, in fact, be decreasing, thanks partly to shell collectors. The triton shell is particularly attractive and can measure as much as 18 inches in length. Consequently it retails for $5. to $15. as a collector's item. Dr. Endean believes that wholesale removal of the mollusks from reefs in the infested areas has been responsible for the population explosions. He estimates that between 1947 and 1960 as many as 10,000 tritons each year have been gathered by shell-collecting vessels operating in Great Barrier Reef waters. The shells are widely on sale in tourists shops around the Pacific.

Although no predators of the adult crown-of-thorns other than the giant triton and possibly the large helmet-shelled mollusk *Cassis* have been found,

Harvest of starfish dries on Green Island.
Hand-gathering seems the most effective control.

the triton theory is not universally accepted. The triton feeds on other common reef sea stars and indeed appears to prefer some of these to *Acanthaster*. Furthermore, though the reefs most heavily infested are those most accessible to shell collectors, these are also protected—the kind of reefs that provide the sort of environment preferred by *Acanthaster*. The starfish are rarely found on turbulent-water reefs such as those of the outer Barrier. Yet even in non-infested areas small populations of the sea star gather in sheltered environments and lagoons.

Some people argue that the triton cannot move fast enough to overtake the mobile crown-of-thorns under nonplague conditions. When competing for food, *Acanthaster* moves as fast as a foot per minute. Despite these arguments, the Australian government has banned triton collecting on the entire Great Barrier Reef, and consideration has been given to importing tritons from Indonesia and the Philippines.

Larvae thrive on man-damaged reefs

Dr. Chesher, who directed the studies at Guam, believes the explanation for the starfish plague lies in what happens to larvae, not adults. He thinks the population explosions are caused by man-made damage to reef surfaces. Blasting, dredging and perhaps pollution can kill corals and other filter-feeding reef organisms that are the most important predators of *Acanthaster* larvae.

Under normal conditons few of the sea star larvae would find a suitable surface, free of filter feeders, on which to settle. But where fresh surfaces are created—as at harbor construction sites—chances are much greater that larvae will survive and grow to adulthood. In this way, according to Dr. Chesher, "seed populations" could quickly develop and then mushroom into true infestations that could subsequently move into areas of the reef where living coral is still abundant.

Although the larva-settling theory attracts adherents by offering a simple and comprehensive explanation, critics ask why population explosions have not happened before in response to natural reef and coral damage. Cyclones, hurricanes and exceptionally high rainfall have often been harmful. World War II fighting scarred the reefs of many South Pacific islands, including particularly Guam and Truk. Unusually low tides that coincide with the midday sun can kill coral.

Perhaps the most alarming hypothesis is that there has been some recent fundamental change in the life history of the sea star. No evidence supports this idea so far, but the thought of a mutant strain of *Acanthaster* raises the specter of a general plague.

Possibly there is no single cause for the infestations. According to Dr. Chesher's theory, timing is important because fresh surfaces for larval settlement are needed shortly after the breeding season—around December and January at Guam. *Acanthaster* may have other predators not yet identified: sharks, perhaps, heavily fished in recent years. Possibly the liberal use of pesticides has somehow upset the ecological balance of the reef community.

Of course most predictions may be overly pessimistic. Certainly in a few areas fisheries will be adversely affected for some years. Elsewhere glass-bottomed boat operators may have difficulty in attracting customers. But if the plague remains as localized as it is now, the damage will be insignificant in the long run. Left to themselves, the sea-star populations must eventually exhaust their food supply and disappear. This has already happened at Green Island and a few other Australian reefs. Pelagic coral larvae will then arrive from other reefs and replace the killed coral.

Ecological studies may show us how to prevent recurrence of the plague. In the meantime, however, we must contain the infestations and at least limit the damage to reef corals.

Poisons are precluded because of the effect on other plants and animals in the sea. Stabbing and mutilating the starfish is completely ineffective; the wounds normally do not cause death and heal easily. The only practical method of eliminating the sea star is to collect it by hand.

The task of catching and destroying *Acanthaster* at Green Island was assigned to a full-time diver, who

managed to remove more than 27,000 specimens from a small area of the reef in 15 months. This number was insufficient, however, to stop the infestation from spreading. The divers needed to remove sea stars from even a few of the most heavily infested reefs would cost much money, possibly for years.

A more practical alternative is to encourage local inhabitants, especially fishermen, to spend as much time as they can gathering specimens in their areas. On Saipan the municipal legislature has appropriated bounty money, payable for starfish turned in to island officials.

As part of the control program on Guam, divers with guns that inject formaldehyde solution into the starfish are towed behind a boat. The formaldehyde kills *Acanthaster* without harming other inhabitants of the reef. Control zones and barriers that the sea stars cannot cross may be established to prevent mass migration into parts of a reef not yet infested. When deprived of living coral the crown-of-thorns will starve to death in a matter of months.

If Dr. Endean's theory is correct, giant tritons may be bred and reefs restocked with them for long-term protection, but this would be expensive, too. Yasuo Suyeiro, a marine biologist at Tokyo University suggests trying an electric fence. A potential of less than four volts, he claims, is enough to paralyze or frighten away the starfish. Ordinary fish would not suffer. The scheme is scheduled for testing this year. In any case, many islands will be kept under close surveillance during the next few years so that any seed populations of starfish that develop can be quickly identified and destroyed.

We are intensely studying *Acanthaster,* hoping that our fears are exaggerated. Meanwhile we look for ways to combat this destroyer of coral. If its power proves to be as great as some say, the next breeding season could be critical. What happens then may signal an impending disaster hard to match in man's experience on earth.

A giant triton, stretching from its shell,
clamps down on a crown-of-thorns.
Twin tentacles jut forward to feel out the prey.

What have you done to your country lately?

Cigarette butts. Gum wrappers. Candy paper. Don't drop them in all the wrong places. Like a sidewalk. Or the highway. Or on somebody's lawn. Or in the gutter.

Every once in a while, make a deposit in a waste can at your Shell station. It's a great way to save. The landscape.

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That way,you not only keep a tidy car. You get a tidy country to drive it in.

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A nice place to live.

The Metropolitan Museum marks a centennial

This year the Metropolitan Museum of Art in New York is celebrating its 100th anniversary. So is the Boston Museum of Fine Arts. The Metropolitan is throwing the bigger and splashier birthday party, as befits the bigger museum and the no doubt splashier city. Although the actual anniversary date falls this month—on April 13, to be specific—the celebration began last October and will continue into the early part of 1971. It includes five major exhibitions, samples of which are shown in this portfolio; one has been completed, one is currently on view, and three are yet to come. Among several smaller shows is an exchange of masterpieces with Boston. Also scheduled are the reopenings of various newly remodeled and refurbished sections of the Museum. In the following pages the Smithsonian Institution, with its complex of museums pays its respects to a single but marvelously complex museum and sister institution, the Metropolitan.

The Phillips Collection, Washington, D.C.

Opening this month: '19th-Century America'

The Museum's longest exhibition, from April 13 through September 7, will be the one in which it celebrates the century in which it was born. That century was a remarkably varied one, especially in the decorative arts; it began with the classic revival, went on through the Gothic revival into pure fantasy and ended with Art Nouveau. For this reason, equal space will be given to the decorative arts and to painting and sculpture. Shown here are two examples from the end of the century: a consummate portrait by the finest American painter of the period, and an extraordinary vase in silver, gold and enamel made by Tiffany & Co. for the World's Columbian Exposition in 1893. The embroidered tapestry behind it was designed by Candace Wheeler.

Left: *Miss Van Buren* by Thomas Eakins, c. 1891, a portrait of one of his students at the Pennsylvania Academy.

Opposite: *Magnolia Vase* by Louis Comfort Tiffany, decorated with flowers from four regions of the United States.

The Metropolitan Museum of Art. Vase: gift of a friend through Messrs. Tiffany & Co., 1899
Tapestry: gift of the family of Mrs. Candace Wheeler (through Mrs. Boudinot Keith), 1928

The Metropolitan Museum of Art, George A. Hearn Fund, 1959

'New York Painting and Sculpture, 1940-70'

The first of the Metropolitan's special centennial exhibitions plunged the Museum, rather surprisingly, into the middle of the 20th century—an era which is not usually regarded as one of its strong points. But the Museum now has a Department of Contemporary Arts, and this was its first major effort. Organized by Henry Geldzahler, curator of the new department, it consisted of more than 400 works by 43 artists, most of them still alive. Despite the title, which refers to a style rather than to geography, it included artists from all over America.

Opposite: Adolph Gottlieb's *Thrust*, 1959, is typical of the so-called "burst" motif he was using at the time.

'Before Cortés': art of Middle America

For the fourth of its centennial exhibitions (opening September 30, 1970), the Museum will turn to the ancient art of this hemisphere. Even though so alien to everything in European civilization, pre-Columbian art has had its admirers from the beginning—including Albrecht Dürer and Benvenuto Cellini, who saw the treasures brought back by Cortés. The Metropolitan acquired its first collection of these objects in 1882, but did not have a pre-Columbian department until last year. This, its first show, will consist of more than 250 pieces—some colossal, some tiny—in gold, wood, stone, ceramics and precious minerals. Complementing this exhibition will be a small show of works by contemporary artists who have used pre-Columbian motifs.

Right: Clay "Chinesco" figure of a woebegone man from the Mexican state of Nayarit, 100 B.C.-A.D. 100.

Collection of Mr. and Mrs. Josué Sáenz, Mexico. Photo: W. J. Landry

The Metropolitan Museum of Art. Gift of William Church Osborn, 1949

The Guitarist by Edouard Manet, 1860, is an early painting by the man who was the father of impressionism.

The Metropolitan Museum of Art, Gift of Archer M. Huntington, 1926

Rembrandt's *Flora* is a portrait of his wife Saskia as the Roman goddess of flowers.

'Masterpieces of 50 Centuries'

As the climax of its 100th anniversary celebration, the Museum will bring together (November 14, 1970 to February 14, 1971) great works of art from 5,000 years and from all over the world. Many of them will be from the Metropolitan itself—each of its 18 departments will set forth its most prized possessions—but many will come from the great museums of Italy, France and England. The exhibition is to be arranged chronologically, with the arts of the East shown beside works of the same period from the West—Heian art of Japan with Byzantine, Ming with European 15th-century. As planned by Theodore Rousseau, the Museum's Vice Director and Curator in Chief, the exhibition—of which he is in charge—"will be a concentrated lesson in the history of art, illustrated by works of the greatest beauty and quality."

'The Year 1200': its special glories

What many people may consider the most dazzling of the centennial shows—if only because of the gold, the gems, the enamel and the glow of stained glass—is the one currently in progress (through May 10). "The Year 1200" actually encompasses a 40-year period from 1180 to 1220, when Romanesque art and architecture were giving way to Gothic styles. It was the time when Philip Augustus was putting together the kingdom of France, and the cathedrals of Amiens, Chartres, Reims and Nôtre Dame were all under construction. To reflect this rich, concentrated period in the history of art, some 300 works have been assembled from church, state and private collections in 14 countries. Many of them are national treasures which are leaving their country of origin for the first time.

The Metropolitan Museum of Art. On loan from the Cleveland Museum of Art, gift of J. H. Wade

A characteristic work of the period is this crucifix in champlevé enamel and gilt on copper; Limoges, c. 1189.

by Russell Lynes

'Mother hen': the Met at 100

Even while the feather-preening goes on, the nation's biggest and richest art museum prepares for its second century

The Sunday before last Christmas in New York was one of those wretched days when the air was filled half with snow and half with rain and the sidewalks were a misery of slush. Nonetheless, after lunch I took myself off by foot to the Metropolitan Museum of Art, about a crosstown mile away, to satisfy my curiosity on a number of matters. One was the simple question of who besides me would be so foolish as to turn up on such a day; for another, I wanted to see the Christmas tree and crèche from 18th-century Naples which I had heard delighted accounts of but had not seen.

On the first count, there were so many people trying to get in that the Fifth Avenue entrance was being used as an exit, and I had to walk around through the parking lot, along with hordes of others, to the Park entrance. It was the only time I have ever been to a museum when one was not made to check his umbrella, a weapon which under ordinary circumstances museums shudder at. The checkroom was overflowing. There were young families carrying their babies papoose-fashion on their backs; there were proper ladies in mink; there were hippies wearing bells and trying, successfully, to look like Arlo Guthrie. There were the usual glum figures sitting on benches and staring straight ahead because their feet hurt, but for the most part everyone was looking, some were making notes, some were photographing sculpture or paintings or each other. Around the Christmas tree, covered with terra-cotta polychromed angels about ten inches high and with a wonderful crèche of figures and animals and a ruined Roman temple at its base, people stood quite literally with their mouths open. I cannot explain why, unless it is everyone's dream of the ultimate Christmas tree, but I have never seen an object surrounded by so many raised eyes and slack jaws.

A few days later I called a friend on the staff to ask how many people had turned up on that foul afternoon when the Museum was open only four hours.

"I've got it right here somewhere," he said, and after a pause: "There were 48,339." This is easily three times as many people as would have turned up on a Sunday 15 years ago. The fact that some parts of the Museum were a shambles, that some parts were cut off entirely to the public, and that the main entrance was being remodeled behind a high board fence may have deterred some. On the other hand, the exhibition of "New York Painting and Sculpture: 1940-1970," which had so infuriated the New York critics and so delighted the young, probably brought in a great many who would have gone elsewhere to find "the scene." Everyone in New York who was not watching football on TV seemed to be there. It was not precisely an art-lover's contemplative paradise, but only the most recondite art-lover would not admit that there was excitement in this much concern, curiosity and "show me" on the part of the public.

A few weeks later Thomas P. F. Hoving, the director of the Metropolitan who has a natural gift for raising the hackles of a great many people and charming a great many others, took me on a brief tour of the

Russell Lynes is a former managing editor of Harper's *and now a contributing editor to the same magazine, as well as to* Art in America. *Among his books are* The Tastemakers, A Surfeit of Honey *and* The Domesticated Americans.

Centennial symbol by Frank Stella

Museum's more disrupted areas. We stood on the balcony looking down on the "great hall" into which the main entrance opens.

"It's a beautiful space, isn't it?" Hoving said.

Its columns and high round arches, its elegant niches empty of plaster casts, its granite floor uncluttered with sales desks—even though strewn with the normal rubble of remodeling—did indeed have an elegance that had long been obscured. It was designed in the 1890s by Richard Morris Hunt, the first American architect trained at the Beaux-Arts in Paris.

"It is going to look the way Hunt meant it to look," Hoving said. We walked down the wide marble stairway to the floor of the great hall.

"We're going to remove these steps someday," Hoving said. "You'll be able to see from the front entrance straight through the medieval hall, the great screen and the sculpture galleries to the Lehman wing."

"The Lehman wing?" I asked.

"I can't really talk about that yet," he said.

A royal flush and a full house

It is not a secret, however, that during the few years that Hoving has been director the Museum has acquired two very remarkable collections, the Robert Lehman collection and Nelson Rockefeller's collection of primitive art. The Lehman collection of paintings and drawings (from late medieval to this century) and decorative arts is surely the greatest remaining private collection in this hemisphere and quite possibly in the Western world. Robert Lehman greatly enhanced the collection that had been started by his father, Philip, until it was the golden apple of the art world. For years no one was sure what museum, if any, would get it. Lehman played this royal straight flush very close to his chest. Would it go to his children? And if so, how could any private individuals conceivably pay the taxes on all those millions upon millions worth of Rembrandts, El Grecos, Sassettas, Leonardo and Dürer drawings, majolicas and seemingly endless other treasures? Would it go to the National Gallery of Art in Washington? To Yale? A few years ago Lehman was made the first Chairman of the Museum's Board of Trustees, a post created for him. He was assured that if his collection came to the Metropolitan, it would not only be kept together but a special wing would be built for it. Not since the National Gallery acquired the Mellon and Widener collections had any museum been thus blessed.

The Michael C. Rockefeller Collection of Primitive Art, as it will be known, brings a very different kind of richness to the Museum, a kind it did not have before. It too will have its own wing, this one on the south of the vast complex of structures built around other structures, old façades enclosed by new ones, that is the present Museum. It will be a pavilion where the parking lot now is, and will not, one is assured, encroach on the jealously held greensward of Central Park to the edge of which the Museum clings. When the Rockefeller collection was exhibited last summer it brought gasps of astonishment, not only for the variety and quality of its objects from Oceania, Africa, the Americas and the Arctic, but for the elegant drama of its display.

"I can't show you the master plan for the Museum," Hoving said.

Every museum in any city of any size that looks to the future has a building plan for many years ahead. I was content to be shown what was in front of my

nose and what it signified for the immediate future. We walked across the great hall to the makeshift plywood doors that closed off the main entrance during construction.

"I'd just like you to look out here," he said, and with a key from his pocket unlocked a large padlock and let me out onto the mixture of sand and snow on the wide landing at the top of the stairs. They went down in three stages and in three directions—a sort of leveled-off pyramid at the top of which were the columns framing the entrance.

"Beautiful!" Hoving said, holding out his long arms. "Fountains on that side and on this side. Driveways there and here. Can't you see kids with their arms around each other sitting on these beautiful steps?"

New philosophies for refurbished rooms

The Metropolitan Museum of Art is not only in a state of physical transition, but, like so many other museums, it is engaged in refurbishing and revising the philosophy which underlies the concept of its function. It cannot help but be a temple of art, a sanctuary of treasures, for that is what its vast and varied collections intrinsically are—minutiae and masterpieces, beautiful trivia and commanding statements of faith from five thousand years of recorded civilization. It cannot help but be the guardian and conservator of these treasures.

By tradition it is also a center of scholarly research, of studying and documenting and cataloging and publishing its own collections, of adding to them with discretion and with the continuing aim of filling in gaps. It is more than handsome displays of painting and sculpture by schools and dates with proper labels, of cases of medieval swords and helmets and mannequins in full armor on plaster steeds. It is more than Adam rooms from London mansions and country houses, furnished with examples of superb *boiserie* and cabinetmaking, or rooms in which Madame de Pompadour might have sat in a needlepoint chair surrounded by Boucher tapestries, her feet on a Savonnerie carpet, and sipped her chocolate from a Sèvres cup. All of that is there, of course, along with buddhas and Egyptian tombs and pots from China and Japan, with medieval sculpture and stained glass, with pre-Columbian terra-cotta figures and gold, with miniatures and murals, temperas and frescoes, with Cycladic figurines four or possibly five thousand years old, looking like yesterday's moderns just before they went abstract, with Greek vases and Apollos and the portraits of Roman dignitaries and their gods and godlings.

There are more than 365,000 items in the collections—several lifetimes of looking.

But the concept of the museum as a temple of art, to which the faithful come to worship and where the heathen may come to partake of the mysteries if they are so inclined, is as out-of-date as the original building of the Metropolitan with its galleries of plaster casts of ancient sculptures. The educational function of the Museum was written into its charter. In the eyes of its founders it would not only provide the public with "ample means for innocent and refined enjoyment," but also with "the best facilities for practical instruction and the cultivation of pure taste in all matters connected with the fine arts."

Temple of art or a place to learn?

There has always been a conflict between the temple concept and the educational concept of art museums, with scholars and curators traditionally a solid phalanx guarding the temple, and trustees and administrators looking outward to the community in order to

justify their museum's existence. This is not to say that there have not been many trustees who regarded the Metropolitan as something of a private preserve, as a means of perpetuating their names and their collections and hence their stance as public benefactors. Indeed, without them—without, one might say, their vanity—the Metropolitan would scarcely be the treasure house it is, and there would be little in the temple to tempt the people. But the days when the public was expected to seek the Museum and grasp what crumbs of satisfaction it could from rows upon rows of named but unexplained objects have long since passed. The Museum is not content with just having hordes pour through it. It envisages its role as active, not passive; not just as a resource for the resourceful and the already knowing, but as an aggressive institution for community education and a participant in the life that pounds and swirls about it. It wants to be and means to be a vital part of "where the action is."

Putting the collections to work

To talk with museum administrators today (and not just with those at the Metropolitan), one would think that this public approach was a revolution in museum philosophy. In 1936 R. L. Duffus, in an article in the *North American Review,* was gratified to note that the Metropolitan "was putting its collections to work. It was making people see what the past has to do with the present: not the past of books, which are sometimes hard to read, but the past of the things books tell about, with the brush marks, scars of the chisel, toolings, weavings and embroiderings of patient, long-vanished fingers still visible." Henry Watson Kent, the secretary of the Museum in those days, wrote: "It was plain to see that a public institution of art was, in the last analysis, a public servant, and that the things to do were the things which worked for the public welfare." This, he noted, was at complete variance with the European concept of the museum of art as a place that merely "housed the treasures the country had accumulated by hook or by crook." In America, which had no great traditions of art that were its own, he said, the function of the museum was to "become a teacher in the truest sense."

Hoving's ideas and those of his Department of Education and his new Community Relations Department are not in contradiction; if they carry it no further in concept, they certainly do in techniques.

To explain or not to explain?

In talking with a number of curators and members of the administration, I found that the man least concerned with explaining what he was exhibiting was Henry Geldzahler, who is solely concerned with the arts of today, the least understandable to many people. "Why should you explain the context of today's arts to people who are living today?" he asked. On the other hand, the curator in charge of other curators, Vice Director Theodore Rousseau, explained to me that each department will eventually have an "orientation" gallery ("I hate that word 'orientation,'" he said) to explain to the uninformed visitor the context in which to look at the works of the specific collection. It will describe the techniques as well as the history and geography of the arts concerned, and in the case of paintings and sculpture the principles of form and color and composition that have always been the artist's concern.

"Communication" is the cliché password to salvation today, and the "failure to communicate" is to a museum, as it appears to be to everything else, the deadliest of all the sins of omission. To communicate within the walls of the Metropolitan any reasonable device is, or will be, employed. One can carry an electronically canned lecture at one's ear as one wanders from gallery to gallery. One can pause in a darkened room to watch a movie explaining what one has just seen or is about to see. One can read labels that, if they do not tell all, tell enough. One is encouraged *not* to look first to see who painted a picture or carved a sculpture before deciding whether the object itself is worth looking at—as most people do on the theory that a Rembrandt is worth their attention but a Nicholas Maes, his follower, is not.

In many respects the most thorough and most effective introduction takes place in the Junior Museum on the ground floor, where there is an imaginative and ingenious exhibition called "The Artist's Workshop." It explains and demonstrates with films and sounds and mock-ups and dioramas the techniques by which

man has made art all the way from the Paleolithic cave paintings of 30,000 years ago, through tempera and fresco and oil, through graphic techniques from the earliest woodcuts to the lithograph and silk-screen, through stained glass to modern color wheels. There are lots of buttons to push, lots of holes to peep into. It is a delight.

"The Junior Museum does what the whole Museum ought to do," Joseph Noble, the Vice Director for Administration, said. "We estimate that some 500,000 children and their teachers and parents visit the Junior Museum each year."

Harry S. Parker III, in charge of education, said: "School trips to the Museum are now mostly just a change of pace from the classroom. They ought to be prepared for. We'd rather have fewer kids better prepared. We've got all we can handle now and more."

So the Museum, as it did not in Secretary Kent's day, is moving out of its palace and into the schools. It is helping to train teachers to prepare their students for museum trips.

The Museum is reaching out into the community in other ways, too. It has arranged "college weekends" during which students are invited to come and see the special Centennial exhibitions at hours when they are closed to the public and to hear lectures and see films especially arranged for them. ("Three hundred kids came from 40 colleges and universities for the New York show," Parker said.) The Museum has bought a big flat-bed trailer truck that is going to go from place to place in the five boroughs of the city. It will have inflatable sides and will be called "The Eye Opener" and contain an exhibition that, hopefully, will tell the Museum's potential constituents how to look at what they see if they come to visit it. It is not easy to draw the line between what is bait and what is education . . . not that it matters greatly.

More than merely a local emporium

There is something of the mother hen about the Metropolitan Museum that is an undeniable part of its personality and charm. It thinks of itself, not without justification, as the mother of all other American museums of art, and though it was founded in the same year as the Museum of Fine Arts in Boston, it considered itself from the start a national and not just a local institution. It was not, of course, the first American art museum, far from it, but it was the first attempt at creating a collection that would be what its founders called "a National Institution and Gallery of Art." [Although the Smithsonian Institution was founded in 1846, it did not have a significant art collection until it accepted the gift of Charles Lang Freer in 1906.] It has taken its national responsibilities seriously, and woe be to anyone who suggests that it is merely a local emporium of taste and culture!

"You will note," Noble said to me, "that New York does not appear in our name. We were the first national museum, and we've been responsible for training everybody else's staff. We spawned the movement."

The Metropolitan at present has out on loan to other museums something like 20,000 objects from its collections. It has, when new museums have been founded, loaned generously to them so that they might have adequate displays until they were able to acquire comparable examples of their own. The Museum, however, is extremely fussy about which other museums it will lend to, because pieces are not infrequently damaged by inexpert or careless handling. The staff has prepared materials for the use of other institutions on the "care and feeding" of works of art and artifacts, and these have become standard procedures. Noble mentioned "the godlike role of the Met" with a straight face, and with justification. In depth and breadth and quality it has no peer in America and few in Europe.

It takes its maternal role seriously in preparing its children to assume their responsibilities in other museums, and its program for training curators and conservators is at present the only one of any consequence in the country. It works with its neighbor, the Institute of Fine Arts of New York University, currently the most distinguished graduate school in the field. It has, moreover, its own fellows, scholars to whom it provides fellowship grants which were endowed by Chester Dale and J. Clawson Mills. Some of them are young men and women just embarking on careers of connoisseurship, some are distinguished professors attracted by the opportunity to work on specific aspects of the Museum's collections, as, for example, a Korean Jesuit priest who came to work on

Oriental paintings. Competition between universities and museums for art historians in recent years has been acute, and the museums have come out on the short end of the stick. Universities pay better salaries, offer sabbaticals and tenure. I asked Hoving if the situation had improved.

"We're closing the gap," he said, putting out his hands and bringing them together, but not quite letting them touch. "Something like 11 of our curatorial staff are now teaching full courses as well as doing their work for us. They like that, and our salaries are getting better all the time, and we can now give them sabbaticals."

When "mother hen" lays an egg, it is, as Mayor LaGuardia used to say of his boners, "a beaut!"

Its greatest and most famous recent egg was the exhibition called "Harlem on My Mind," an ill-starred attempt to make Harlem proud of itself. In looking back at this fiasco which brought militant blacks to picket the Museum because the show was not black art and was not conceived and arranged by blacks but was, rather, an outsider's view of Harlem, the members of the staff still wince. Seven hundred members of the Museum cancelled their memberships in a week. "You never saw such letters," Hoving said. "But someday people are going to look back at that show as a turning point in the life of the Museum, a reaching out to be involved with the community."

No matter what a museum does it is attacked from some quarter. The holiness-of-art group is always going to be at loggerheads with the art-is-for-everybody group; those who believe that expansion means sacrifice of standards, that art is difficult and demanding and that attempts to make it easy merely demean its values, will fight on the barricades with an elite guard of art-lovers against the incursions of the popularizers and publicists. It is a very old fight and a very useful one. It is also a fight in which neither side is ever going to be able to claim a clear-cut victory. There will be truces; there will be long stubborn sessions of negotiation, curators battling directors and directors battling trustees.

Meanwhile the collections will grow, the scholarship will become broader and more penetrating, scholarly publications and catalogs will agonize their ways through the editorial and publishing processes onto the sales desk and into libraries around the world. Galleries will be lighted by newer (not necessarily improved) systems, gadgets for bringing people and pictures closer together will proliferate. Community programs will struggle with the problems of taking the Museum to the people and of bringing the people to it, while conservators in laboratories will labor with microscopes and X rays over the minutest details of the pigment of a 14th-century tempera painting or the glaze on a Chinese porcelain.

The Metropolitan sometimes calls itself a "free university," and like other universities it is under new pressures from without as well as from within. It is attacked as the plaything of the Establishment, an extravagance a city with such burdens of poverty can ill afford. It is defended as a cultural bastion, a bridge with the past, a resource for the present and the future. It is attacked by militants as "irrelevant." It is accused on the one hand of plunging ahead and on the other of dragging its feet. Meanwhile the state of transition goes on.

There are a good many New Yorkers of whom I am

one who feel that the Metropolitan is their private preserve. I have grown up with it (and to a degree it with me) since I was in my teens 40 years ago. I have walked hundreds and hundreds of miles in it, and its walls and cases and pedestals are full of old and new friends of mine at whom I sometimes nod as I walk by and sometimes stop and converse with and who, by proximity, introduce me to others I had not known or who were new to the place. When the Museum puts on new clothes I am not disturbed (though I am sometimes not in agreement), but I am infuriated when I cannot find an old friend where I've decided it must be. This, I understand, is to be remedied by having fewer pictures and objects on display and the others readily available to those who want to see them in so-called study collections. "There is a vast difference between what the six million can take and what the scholars need," Hoving said. I consider myself one of the six million casual scholars, and I am not at all sure I like being subjected only to what curators think is good for me unless I am willing to talk my amateur way into the study collections.

But this is part of the good, perpetual fight that has been going on since 1870 when the Metropolitan opened its doors for the first time in a former dancing academy on Fifth Avenue and Fifty-third Street. It will be going on a long time after it makes any difference to you, sir, or to me.

The Museum's redesigned façade (Kevin Roche, John Dinkeloo and Associates) promises an easier flight of steps and fountains on either side.

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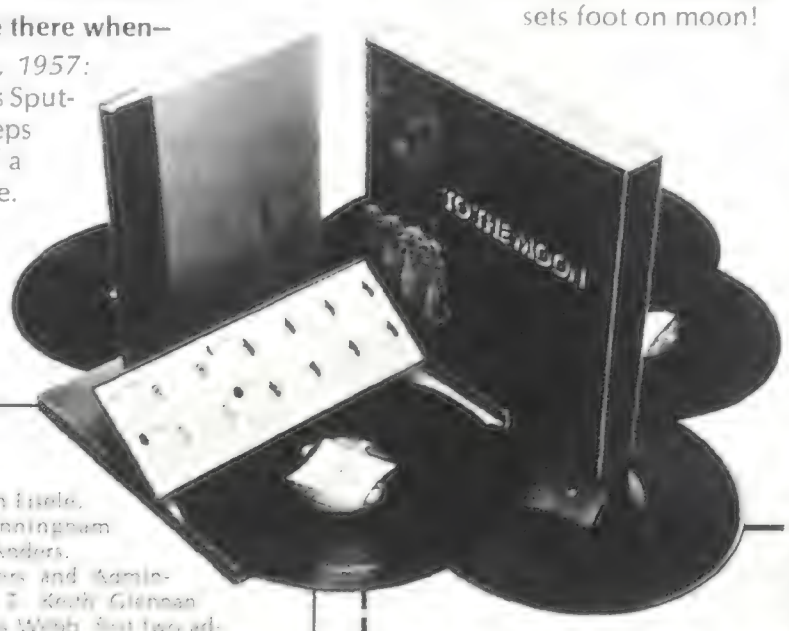

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Unfamiliar or common images stimulate a variety of reactions

"I see a blue sliding board," says Jeff Kaigen of recess scene.

Finding a red, Ronnie Gilpin is gratified by color hunt.

"No, that's a circle," says Debbie Coggshall with conviction.

Counting triangles, Sara Ruth Houser and Mary Livengood shout "One, two, three!"

"The balloons are all different colors!" Brian Flagler and Paul Pincus learn to observe.

Relaxing on backrests which are placed at random in circular room, sixth grade students are completely surrounded by sights and sounds of a busy intersection in nearby Philadelphia.

Education in the new learning laboratory is heuristic (learning by discovery): In a very real sense students are not "taught"; they learn for themselves. They ask and answer their own and teachers' questions, disagree, point and exclaim. Excitement runs high. And they love the new room so full of lights and shadows and colors and surprises, where they can stretch out their legs, argue and gape. Use of the Special Experience Room is continuous. From 8 a.m. to 3 p.m. daily, its magic sight, sound and corollary equipment projects sensory, multi-media experiences to grade school classes in relays.

Dr. Henry Ray, crusading champion of environmental learning techniques, program director of the Special Experience Room, fulfilled a longtime dream when his concepts turned into reality. He expects the new teaching facility to enhance the perceptions of his pupils. Especially, he expects it to improve the comprehension and capabilities of retarded educables and trainables, of the physically handicapped, and of the gifted. Classes already include all of these student categories, and Dr. Ray continues to search for new ways to lead these children into the exciting paths of self-education.

Billy Greer and Kevin McCartney excitedly point to a "C" while Erik Cannon hunts for it.

"I see a C too!" exults Erik. Children learn to find shapes and letters in varied contexts.

by John W. Blassingame

'Soul' or scholarship: choices ahead for Black Studies

A searching look at one of the scores of university programs that are springing up to meet the demands of black students

It has all happened so fast. Three years ago the notion that a university student could earn a degree in Black Studies was almost unimaginable. Since then, scores of colleges have answered insistent Negro demands by establishing a variety of Black Studies programs—often with precipitous speed. Let us say that on April 1 black students invade an administration building, on April 8 they force the university president to set up a Black Studies committee, on April 30 they get a report from the committee, and by May 11 the faculty has approved a program.

Can victories so easily won indicate full acceptance by white academics of these black courses? Do such quick triumphs simply keep Negroes from further practices in confrontation, a tactic they will need to know when they battle for decent housing, respectable jobs and better schooling for their children? One student, fresh from conquering a spineless faculty, voiced his disgust almost with tears in his eyes: "Why didn't the SOBs stand up and fight?"

The process of starting a Black Studies program is full of problems and frustrations. To some extent our experience at the University of Maryland characterizes what has happened on many other campuses.

The author, a lecturer at Maryland, is working for a Yale doctorate. He wrote a recent article on Black Studies for The American Scholar. *Yoichi Okamoto served President Johnson as the first official White House photographer.*

Our earliest movement toward Black Studies began in 1967 when the faculty senate approved various black-oriented courses for the next year. The university was then running several pre-college and Upward Bound programs to increase the number of its black students. Yet poor recruiting and lingering segregation in the state college system kept the ratio of blacks down. In 1969 it was less than three percent.

Maryland's Negro students seemed less demanding of Black Studies than those at many other colleges. Perhaps they faced too many other problems. Black graduate students found it practically impossible to rent apartments near the campus and the university had done little to alleviate the situation. When the blacks began sitting together at football games, some white students threw beer cans and other assorted missiles at them. Then, in the fall of 1968, the home economics department barred Negro co-eds from certain dietary experiments on the grounds that they were so different from whites physiologically that the results would be invalid. At this point the demands of the black students to end racism at the university became more strident.

Progress seemed agonizingly slow to the blacks. More black-oriented courses were offered but the students felt that the black experience was still largely ignored. The history department became a special target with its "History 117: The Negro in American Life." Although 240 students signed up for it, hundreds more were turned away. The result was an open letter to the student paper, *The Diamondback,* demanding that other sections be opened, that Louis Harlan and I stop editing the Booker T. Washington papers to help teach the course, pending the hiring of other teachers.

There was much logic in the open letter. Yet it demonstrated the emotionalism which so often marks

Photographs by Yoichi Okamoto

History 017 student, wearing his 'brim,' listens impassively to a lecture on his Afro-American heritage.

Black Studies debates. Essentially, the student authors wanted the university to abolish its usual admission standards in order to recruit more black high school graduates. It seems to me that a more rational admission procedure for blacks should emphasize interviews and recommendations by school faculties.

In partial response to the demands of the open letter, the history department, in February 1969, gave five lectures to observe Negro History Week. Meanwhile black students confronted the president, met the Board of Regents and went to Annapolis with faculty members to petition Maryland's state legislature to set up a commission for the study of Negro history. Finally, on February 25, 1969, the university president appointed a seven-man committee to determine what should be offered in the way of Black Studies.

The committee consisted of four department chairmen, two faculty members, one white and one black (myself) who had written widely on the black experience, and one student. At our first meeting we decided to include two more students—the president of the Black Student Union and a black graduate student in the education department. We then looked at and rejected several Black Studies programs proposed for other colleges and discussed our own approaches.

Broadly speaking, we had two experimental concepts to choose from: "soul" courses of Black Studies intended only for black students, and a "soul-centered" program intended for both blacks and whites. The soul program glories in blackness and teaches empathy with the black community. Its range of new courses is awe-inspiring, its goals staggering. Ambitious soul advocates urge their own department, even their own college within a university. Given college status, they often push the "third-world" concept, that all the world's colored people have "soul."

"I am a bureaucrat!" Visiting lecturer Walter Lewis jars an anti-bureaucracy class awake as he discusses urban ills. He was a former assistant secretary at Housing and Urban Development.

Union of all colored peoples?

I applaud many aspects of the soul program and I am fascinated with the third-world concept. Even though the Chinese and many Africans have racial and tribal superiority complexes, a union of colored peoples of the world remains our best hope to halt the juggernaut of white supremacy. Yet I suspect that the soul program provides little impetus in that direction.

Take languages, for instance. When the revolution finally comes, American blacks will not be able to communicate with the rest of their third-world brothers. Americans concerned about their African heritage should read the accounts of Arabian, Portuguese and Italian explorers who toured sub-Saharan Africa before the mid-18th century. Yet no soul program requires these languages. Instead, soul advocates add Swahili to their curricula—while students in leading African universities are taught in English and French.

The community action involved in soul programs has exciting possibilities but often mixed motives. On the one hand, white academics, shocked by violence in the "ghettos," want to use their black students as barometers of anger in the black communities which frequently encroach upon the college gates. On the other hand, middle-class black students, suffering guilt pangs because they were not born poor, seek atonement by sharing vicariously the pain of poverty. These students and their teachers do not seek advice from the black community before starting to work within it, but simply spend their few weeks in the ghetto and then escape its terrors.

None of these soul advocates try to answer the first question raised by the poor black: How can an end be found to periodic riots, to the tyranny of an occupation army of white policemen? Most students are repelled by the answer of angry blacks: *Lex talionis,* the law of reprisal. If the city, they say, does not add slum residents to the police force and require integrated patrols in the black community, the blacks have a right to form a *posse comitatus* to hunt blue-

coated outlaws and reply to the brutality of billy clubs with ambush and assassination.

Rather than deal with such problems, soul advocates focus on more romantic features of the ghetto. Some may offer such a course as "Selection and Preparation of Soul Food" when most slum dwellers want to learn how to squeeze steaks or real butter out of meager budgets. Soul students attend classes in "Black Rhetoric" while most blacks want to learn to speak standard English well enough to hold a decent job.

Poorly financed and loosely planned, many community action programs seem to me an insult to the blacks they are supposed to help. The ghetto resident looks up and sees a few prosperous young Americans going slumming. Where, he may ask, are the needed adult-education courses? Where are the training centers to help him get off the dead-end street of unskilled labor and onto the main avenue of computer programming and other space-age occupations? If the predominantly white college is so concerned about the poor black, why doesn't it pay predominantly black service employees a living wage? Why doesn't it organize student-staffed nursery schools for working mothers? Why doesn't it permit some slum dwellers to use the student health service?

I find all these questions disturbing. I also see a cruel hoax perpetrated on black students by the soul program's community action. It clearly implies that blacks, through their own efforts, can lift themselves up. I am afraid such a suggestion will lead the students to concentrate too much on the immediate problems of the black community. No matter what tools students acquire from these programs they will prove inadequate to the task of getting all the poison out of the ocean-sized cesspool of American racism. Instead of attempting bootstrap operations or practicing techniques that are doomed to fail, blacks must learn to force whites to shoulder the burden and appropriate the money for wiping out centuries of oppression.

A place for chitlings and James Brown

Because they are segregationists at heart, many white academics reject the legitimacy of Black Studies. They allow black students to organize any kind of soul program, the more irrational and separatist-oriented the better. Many white administrators grant separate social facilities to blacks on the grounds that students of one nationality or religious denomination get similar facilities. These centers prevent students of different backgrounds from getting to know one another. And, if you brush aside that objection, can you seriously argue that blacks should be provided separate facilities because they belong to one religious sect or because they enjoy a separate nationality?

The black students demand these social centers because they say they feel uncomfortable with whites. For their own sense of security and well-being they need some harbor to sail to from the uncomfortable stares of "Mr. Charlie." Chitlings, black-eyed peas, James Brown and "rapping" with the brothers eases the pain of being one of the few blacks at a predominantly white school. Blacks clearly prefer the camaraderie of such retreats to the shallow, impersonal relationships of a multiversity. They have been refused dates, dances, sometimes even recognition on the streets by their white classmates. Their reaction is a defiant, "Who needs you?"

Yet despite their defiance these blacks are reinforcing the contention of white racists that blacks should be segregated in their own colleges, social centers, libraries and neighborhoods lest they feel awkward and inferior interacting with whites on equal terms. The black students have sought to build a comfortable all-black world within the white college. The cynic argues, of course, that if the blacks had really wanted an all-black environment, they could have gone to an all-black college.

There is another side to this separatist coin. It seems to me that John Mercer Langston, 19th century Negro Congressman from Virginia, was just as defiant as today's students about denial of social equality. Censored for having "learned to walk with white

Black history—what students learn

History 017 is the University of Maryland's introductory course for its Black Studies program. During one semester students survey the whole sweep of black history from West Africa at the time of medieval Europe to the 20th century urban ghetto. They learn about African religion, land ownership and slave trade. They are taken on the nightmare voyage to America, into colonial slavery and on through the Revolution.

Young people learn how it felt to be considered property, how in the South a slave's every action could be regulated. Under the Black Codes, he could not own a firearm, nor beat a drum or blow a horn, nor visit a white or a free Negro, nor assemble with other slaves unless a white was present.

He survived the psychological damage of slavery by subtle insubordination—breaking tools, feigning illness, loafing on the job. Slave songs reveal an obsession with Moses leading his people out of Egypt. Always there was the chance of an insurrection like Nat Turner's in 1831. New repressions followed each threat. For example, South Carolina clapped Negro seamen into jail when their ships made port.

Students discover that in the antebellum South many slaves were freed by deed of manumission—literally, "letting go of the hand." At the start of the Civil War there were almost half-a-million free Negroes. A very few prospered. Thomy Lafon made half-a-million dollars in New Orleans real estate. A few rich blacks even bought plantations and owned slaves.

Most free Negroes flocked to cities. Baltimore held 25,600 of them by 1860. Restrictions still shackled them. In the South, they had to show passes when stopped by white authorities—otherwise they became slaves again. Those who journeyed North met fresh hostility.

History 017 looks at the Civil War through the eyes of black soldiers who made up ten percent of the Union forces. Generally, blacks were not paid as well as whites. One Massachusetts regiment refused to accept pay for a year—until the rate was adjusted. Reconstruction gave freed slaves a chance to participate in government. From 1869 to 1901, 22 blacks served in the U.S. Congress; Louisiana elected P.B.S. Pinchback as lieutenant governor and he served as acting governor for 43 days. Generally, however, Reconstruction for blacks was more dream than reality.

The Jim Crow era followed, fixing segregation in law. Booker T. Washington, rather than battling social restrictions, urged blacks to improve themselves so they could compete with whites. W.E.B. DuBois organized the Niagara Movement as a militant answer to Booker Washington. Race riots erupted. Marcus Garvey urged his people to return to Africa.

And so the student is brought to the present—Harlem, a ghetto before 1915; Watts, a ghetto after World War II; civil rights; Martin Luther King; the growing separatism that now continues into this very classroom with its whispering coterie of about 25 militant students. The whole class numbers 200.

Dr. Louis Harlan, director of this black history course, thinks it "sensitized suburban white students to the harsh experience of blacks in this country. We know," he says, "the blacks are dissatisfied, but we are still experimenting with ways to engage their interest."

AUBREY E. ZEPHYR

women," while a student at Oberlin, he retorted to his white critic: "If you have in your family any good-looking, intelligent, refined sisters, you would do your family a special service by introducing me to them at once." Some black co-eds now contend that too many black males, despite separatist pronouncements, take the Langston approach where blonds are concerned.

Our separatist students have forgotten some of the principles of black folk wisdom: The only way to determine Mr. Charlie's game is to watch him on intimate terms and learn from him. If Charlie can segregate you he can and will discriminate against you.

At the University of Maryland we decided we had neither the intellectual nor financial resources to institute a soul program. For the same reasons, we felt we could not establish a Black Studies department. We were not sure that a B.A. degree in Black Studies offered enough opportunities in employment or graduate school to justify a department.

From the first, our chairman demanded strict conformity to the procedure of setting up any new program. Two committee members volunteered to draw up proposals for the program, stating its objectives and the courses it would offer. Another member compiled a list of all black-oriented courses and all other special programs offered by the university. These reports were distributed to all committee members before our third meeting. They became the basis for subsequent discussions.

We were determined that our program would be flexible, yet would be as demanding as any offered by the university. We resolved to have it ready for the next year. A number of faculty members argued that a senior research paper should be required, but the student members insisted that if the program seemed too difficult it would scare away many students. In the end we took the easy way out: We recommended a senior paper but left it up to the program director to accept or reject our recommendation.

The committee agreed that while it might be desirable to appoint a black director it was more imperative that he be qualified. We felt that generally blacks

Question and answer period arouses interest from Maryland Black Studies students of many complexions. But most are white.

were more qualified to teach most black-oriented subjects. However, the competition for Negro teachers is so great that the university would have little hope of recruiting them in large numbers. Again, we insisted that ability and not skin color be the standard.

It is indeed puzzling that whites at other colleges so often receive congenially the black students' contention that only blacks can teach black-oriented subjects. If the idea were pushed to its logical absurdity we would have to invade several countries in order to obtain Latin Americans to teach Latin-American subjects, Frenchmen to teach French-oriented subjects, Russians, Chinese, and so on. Even though I recognize that the minds of most whites, however well-meaning, have been terribly warped by racism, I see potential danger in this attempt to monopolize an intellectual sphere. If the painful experience of being black in America qualifies a black man, and him alone, to teach black-oriented subjects, could you not reason that the same experience bars him from teaching white-oriented subjects?

The late Malcolm X pin-pointed this problem clearly: "Most whites, even when they credit a Negro with some intelligence, will still feel that all he can talk about is the race issue; most whites never feel that Negroes can contribute anything to other areas of thought and ideas."

Too often, black students have simply reinforced this idea. It would be far better if they listened to the words of Frantz Fanon: "... it would give me no pleasure to announce that the black problem is my problem and mine alone and that it is up to me to study it."

With a shortage of trained personnel, Maryland's committee concluded that the only way to institute Black Studies was to draw heavily on trained people in the Washington and Baltimore areas for occasional lectures and to give financial support and time off to faculty members while courses were being prepared. We felt that any program established at the university or anything sponsored by it should be open to all students. We recognized the legitimacy of black demands for developing self-pride, but we felt this would be a natural outgrowth of the program.

We agreed on two general objectives: to enable students to lead a meaningful life in a multiracial society; to help students understand the problems, prospects, successes and failures of the Negro population in the United States and the world.

We studied Maryland's list of black-oriented courses and found that some overlapped excessively or had too slim an intellectual base for our program. We selected subjects with logical objectives, meaningful to the program—and with a sizable amount of literature available to the students.

The four core courses

Our final report recommended the establishment of an independent Afro-American Studies Program similar to our American and Latin American Studies Program. It would permit students to major in one of the traditional departments while taking six courses in the program. It would grant them a certificate.

We asked for restraint in setting up black-oriented courses. We suggested that the university sponsor conferences on such contemporary problems as racism, poverty and welfare. We urged more effort to integrate material about the Negro into general courses.

We recommended that our Black Studies students be required to take four core courses: The Negro in American Life, Afro-American Literature, Seminar in Afro-American Studies, The Sociology of Race Relations. In addition, he could elect two courses out of the following: Cultural Anthropology, Afro-American Folklore and Culture, Civil Rights and the Constitution, Race Relations and Public Law, A Survey of African History, Ethnic Minorities (Sociology), Directed readings in Afro-American Studies.

Although we spent several hours in biweekly meetings and wrote many preliminary drafts of the report, we did not submit it until May 1969. Consequently the full faculty senate did not approve it until the beginning of this school year.

We have by no means solved all of the problems

involved in establishing the Black Studies program. Most difficult of all has been the matter of obtaining faculty. Since all teachers in our program must be based in a department, the task of hiring falls to the departments. The English and history departments have so far been most successful in their recruiting. Even so, two members of the history faculty who were slated to teach the upper-division course in Negro History went on leave. As a result, a black graduate Ph.D. from the University of Michigan was hired to help fill the gap. The trouble with that was that this young lady was lost to us all the first semester. She was working full time to finish her law degree. So we hired a historian from Howard, Washington, D.C.'s predominantly black university, to fill *that* slot. Such difficulties are mild compared to what some other colleges have gone through in mobilizing competent faculty for Black Studies.

As Maryland's program enters its spring term we still cannot write a definitive evaluation of it. But clearly, the black students are not satisfied. They apparently feel it is not ambitious enough. I expect that they will soon demand departmental status for Black Studies. Our committee never ruled this out. We simply vetoed its *immediate* establishment.

The two Negro history courses (see page 62)—one upper division, one for freshmen—typify both the prospects and the problems of the program. In general these courses are taught as are any other history course, with relatively sophisticated readings, lectures and discussions. Since each course lasts only one semester their primary focus is on this century, but they also try to present the black experience within the framework of American history and explore the roots of today's developments. The focus on the 20th century gives the courses more "relevance" than many traditional courses and probably accounts for much of their popularity.

Whites too slow, say blacks

Student reaction to the Negro History courses is also typical of reaction to other black-oriented courses. Some black freshmen have complained because one of their teachers is white. They have found certain guest lecturers ill prepared. They have protested that in discussion sessions they are being used to expiate the guilt of the whites and that they cannot "be themselves." They want all-black discussion sections because whites are "educationally deprived," need remedial work, and slow the pace. Since blacks know all about whites, they say, learning will be one-sided.

In this regard, I feel that the black students have an exaggerated concept of their knowledge of both black history and white psyche.

Generally speaking, the course taught by the black historian from Howard University has been well received. Both black and white students often bring their friends to the lectures. I suspect that this popularity results from having a single teacher and hence more continuity and clarity of purpose. In the freshman course the subject is organized around a number of guest lecturers. Inevitably, there is some confusion.

Each course represents a serious effort to give students an in-depth survey of the black experience. In spite of the dissatisfaction of a few of the blacks, our advanced Negro history course, 117, is one of Maryland's most popular.

I believe we achieved our small success in Black Studies because our black students presented legitimate demands and our faculty responded rationally. Considering that the blacks have faced many problems at the university, they must be applauded for the tactics—both disruptive and constructive—that they used to bring about change. Faculty and administrators, too, deserve credit for resisting the temptation to close off communication with black students or take the easy way out and promise things they could not deliver. The faculty has shown genuine respect for the students. It has neither said "anything is good enough for the blacks," nor argued that the blacks had no cause for complaint.

If both faculty and Negro students continue to see *some* merit in the other's argument, the University of Maryland and other colleges can solve the problems involved in the establishment of Black Studies.

A black militant argues with the lecturer.
The blacks usually congregate
in an upper corner of the lecture hall.

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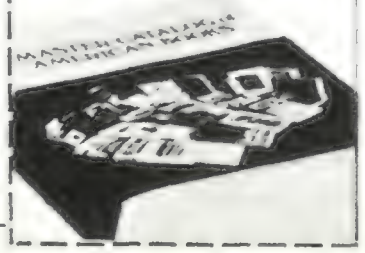

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An ancient craft, macramé, revived

Smithsonian Associates learn the art of decorative knotting in resident classes

Macramé, the ancient art of decorative knotting, is one of many crafts presented in the Smithsonian Associates' workshop series, "Ancient Crafts Revived."

Macramé was practiced in Spain, France and Italy between the 14th and 16th centuries then became less popular and was mostly confined to convents in France. It emerged again about 100 years ago and is currently enjoying a lively revival as evidenced by the 150 adults and children who participated in the Associates' classes. Derived from the Arabic word *magramah* said to mean "fringe", macramé today includes any lace or ropework consisting of knots worked together into a geometrical design.

Working with linen and wool, the class learned the basic macramé knots—the square knot and the half hitch—and experimented with variations of these two knots to create texture and pattern.

Almost any cord can be used that is strong and evenly spun—linen, silk, wool, twine, leather or even metal wire. These can be found in hardware stores and handweaving supply houses. Combinations of cord twist and weight, as well as mat and sheen, give dimension to the finished work. Beads, metal rings, dowels or hoops may be incorporated into the work and are useful starting points.

Practical as well as purely decorative applications of macramé include wall hangings, shade pulls, belts, placemats, purses and fringing towels, curtains or dresses. Macramé is simple to learn. More complete instructions may be found in a book by the workshop's director, Mary Walker Phillips, *Step-by-Step Macramé,* Golden Press.

Linen wall hanging (above) was begun on a small ring, incorporated old Peking glass beads (right). Completed, above, it is 56 inches long, 8½ inches wide.

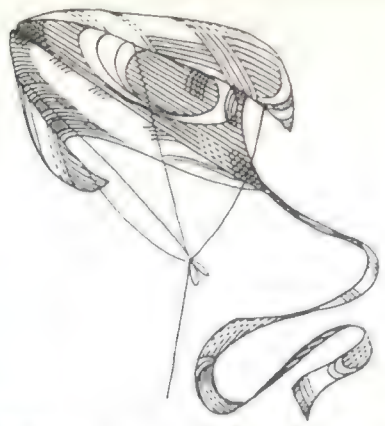
At the Smithsonian workshop students learn the technique of macramé from designer Mary Walker Phillips.

Covered Celotex ruled into one-inch squares acts as a foundation for the knotting. Red wool is here added as a row of double half hitches.

Following two rows of double half hitches, the first half of a square knot is begun. The two outside strands are worked with center strands held taut.

After pulling the first half of the square knot tight, the second half is tied. "T" pins, purchased at any notions counter, hold the work secure.

Square knots have been worked into a triangular pattern here and a row of double half hitches added on an angle on either side crossing in the middle.



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Dr. Calhoun comes eye-to-eye with an albino rat.

by Frank Sartwell

The small satanic worlds of John B. Calhoun

In crowded 'universes' of rats and mice
this contentious scientist reads
warnings of an overpopulated hell for Man

"The Last Trump is timed for twenty-two forty hours precisely."
Christopher Fry, *The Lady's Not for Burning*

Each of us has his own universe. John B. Calhoun, research psychologist at the National Institute of Mental Health (NIMH) has several. Each of them looks like a pet shop in hell, aswarm with mice and rats, and each saddens him. For he holds the belief, unpopular among scientists who see little relationship between rodent and man, that his laboratories accurately predict the future of the human race. The controversial Dr. Calhoun sees us becoming so overcrowded that without realizing the forces at work we will be driven to homosexuality, cannibalism and extreme withdrawal amounting to a denial of life.

All these symptoms Dr. Calhoun has created in laboratory mice and rats at a NIMH Animal Farm near Poolesville, Maryland. He has seen to it that his small subjects live in doubly overpopulated "universes." He believes that not only is the parallel between human beings and his rodents about to become true all around our planet but that some of the effects are already visible in our crowded ghettos.

The standard argument is: a) You can't describe a man by describing a mouse and multiplying it by the square root of pi; and b) the experimental mice are not only not human beings, they really aren't very good mice. They are so thoroughly inbred that they simply don't react like any other animals.

To point a) the Doctor answers: "Rats and mice, of course, are not perfect models of humans. But the disaster they represent is so compelling that the world cannot wait for proof of every step in the equation. We must deal with our crucial problems now."

As for b), "Wild species suffer the same reactions as my albinos, sometimes even in exaggerated form."

To the ordinary eye, John B. Calhoun does not fit the picture of a prophet of doom. A suburbanite, whose 15-year-old daughter plays the oboe, he sports a snappy gray goatee. Although full of doleful predictions, he seems as chipper as an unthinking sparrow when he darts around one of his sheet-metal universes —a nine-foot by nine-foot habitat into which 2,000 mice are jammed.

The mice teem on the "Calcuttas"—mesh feed bins —or lie on the floor in windrows, huddled together as if they knew that death were on the way. (Most of them will be killed, weighed and dissected to determine their physical reaction to mental stress.)

The female mice are pure white; the males are painted as gaily as a totem pole to identify their characteristics. Alternating stripes of red, yellow, green and black brand them as aggressors, hangers-back, former or present malingerers or withdrawn animals.

But among the 2,000 animals even a visitor can pick out certain individuals. There are those that sit on small ledges alone, trembling, oblivious of their bright hues, driven by unbearable despair to escape, if only mentally, from that jammed universe.

Many of these animals are known individually to Dr. Calhoun. He can pick them out from the mass by their movements and habits. Today, perhaps, he may be looking for signs of aggression—attacks on other animals, efforts to establish dominance among those mice which refuse to huddle in dejection. Specifically, he searches for aggressive behavior in mice that have

displayed it before. Two aggressions, in this study, prove an aggressor.

Mice that have been seen attacking others are noted by their color patterns. Their "dossiers" are kept in individual manila folders. What Dr. Calhoun sees the animals do and where they do it, is carefully entered in each folder. These data are important to the mice as well as to Dr. Calhoun. Some of the animals will go on, alive, to another experiment that will try to find out whether under ideal conditions—no crowding, no lack of anything that a mouse might need—they can lose the sick behavior patterns that have been forced upon them.

Dr. Calhoun suspects that they can never again be made whole. He extrapolates that belief into a baleful suggestion that has not occurred to most of our social scientists: Taking a child from a slum environment and giving him some sort of ideal life is never going to repair the damage done in his earliest years.

Regardless of our present ghettos, the whole human race is in serious trouble, Dr. Calhoun believes. In paper after paper he has proclaimed that soon the earth will be so overcrowded as to invite disaster. We are multiplying much faster than ever before—far too fast for all improvements in food grains and power sources to match. The Day of Judgment, already well-publicized by other doomsayers, will fall, says Calhoun, precisely on Friday the thirteenth of November, Anno Domini 2026. On that day, perhaps at Christopher Fry's "twenty-two forty hours," there will be no more room.

To avert this end of the world, Calhoun believes, the population must not just stop growing, it must begin to decline. Further, man must improve his ability to think by attaching to himself some sort of "mental prosthesis," doubtless a super-miniaturized form of computer, which will extend his ability to form ideas as a pedal prosthesis extends a man's ability to walk.

This ability to form ideas, this "conceptualization," has enabled us to multiply to our present extent. It allows us to use our resources ever more efficiently. It gives us the understanding that we can supplement our physical space with "conceptual space"—the realization that a farmer takes up less space than a hunter, that a philosopher or poet takes up considerably less than a farmer. This may seem a long step from the actions and reactions of a few mice and rats, but it is backed by a lifetime of thought and study.

John Calhoun was born in the hamlet of Elkton, Tennessee, a state more famous for producing Davy Crockett. He reflects, in his home in Bethesda, Maryland, that his 52 years have been spent in the ever more disciplined study of nature. The boy who raised chickens and pigs became the youth who trapped animals for museums. He learned the importance of keeping exact records—and of using large numbers of experimental animals—through bird banding. While still in high school he published his first scientific note, the news of his discovery of the first known northern horned lark in Tennessee. When questioned, Calhoun was able to prove his point with finality—he had collected the bird and could show its skin.

The use of a large number of subjects in natural history experiments was brought home to him when, with a friend, he banded 30,000 chimney swifts in Nashville. Banding individual birds is notoriously unproductive work. The chances that someone will find and report any particular bird you band are tiny. But with 30,000 winged messengers bearing your mark, the number of returns can be exciting. It was an introduc-

Mouse universe sustains life with water bottles (1), Calcutta bags (2) food-filled and nesting material in cans (3). Stress of crowding makes some mice fight; others sit trembling. Some seldom venture from nesting holes (4). They are called 'beautiful ones' for they have no scars. Radiating strips (5) mark sectors so behavior can be tabulated. They also give Calhoun something to stand on after he swings himself inside.

tion to "the dynamics of large numbers" as Dr. Calhoun puts it.

A fellowship offered almost by accident took the young biologist to the University of Virginia in Charlottesville. His duties as a collector of living materials for the biology department threw him into contact with graduate biologists, rather than undergraduates. He continued to band swifts, returning to Nashville in the summers to band more while working in an ice cream factory. He made popsicles.

Calhoun's graduate work was carried out, again almost by accident, at Northwestern University. A thesis he published was probably the first scientific paper reviewing circadian rhythms, the inborn "biological clocks" that determine the timing of so many of an animal's actions during the day. These have become familiar today because they are upset by the speed of jet travel around the world. Thus a man whose circadian rhythms run on Seattle time may find himself confused when set down in Rome 13 hours later. Calhoun foresaw this in 1943, when the jet plane was only a gleam in the eyes of designers.

As a prophet, John Calhoun is not entirely without honor. He cries the warning, but in his own words, "a lot of well-known people disagree with me." Many others listen—but not those who are breeding the world toward the doom he expects.

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Book reviews

The World of Bats
Nina Leen and Alvin Novick
(Holt, Rinehart & Winston, $23.95)

Forty million bats clinging to cave walls. Guano ankle-deep on the cavern floor. A suffocating stench of ammonia in the air. Is this any place for a woman? If your name is Nina Leen and you're fascinated by bats, it is. Burdened with cameras and strobes, she waited at such a place—Bracken Cave, Texas—for dusk to fall and bats to ascend. And when they did, "the spectacle was so unique that I nearly stopped shooting." But not quite. In fact, she shot for three years.

In her handsome book—a veritable who's who of bats—she provides a vivid visual documentation of the second most numerous species of mammals on Earth. Not content with "billowing smoke" photographs of bats spiraling out of a cave, she waded into their dark dens and snapped their portraits point-blank. And what portraits! Flying foxes bare their teeth and fight. A pallid bat stalks and kills a scorpion. A long-nosed bat sips cactus-flower nectar. A false vampire soars with a mouse clenched in its teeth.

Nina Leen portrays bats fishing, swimming, leaping, cuddling, combing fur with fingerlike claws, hanging by prehensile toes. In a double gatefold her color camera projects a galaxy of bats against a night sky. Her black-and-white photographs are crystalline sharp; you can count the whiskers on a leaf-nosed bat. The pictorial quality is no lucky accident. A longtime *Life* photographer, she has exhibited limitless patience in obtaining her pictures.

What the pictures don't say, Yale physiologist Dr. Alvin Novick does; his lucid text debunks as it informs. A sampling: vampires rarely bite humans (they prefer unsuspecting cattle); bats are not a threat to man as rabies carriers ("More people die . . . from contaminated food consumed at church suppers"). Though little appreciated, bats serve man by feasting on insects. In Texas alone, at least 6,600 tons are eaten annually by Mexican free-tailed bats. Once in the Congo, Dr. Novick, opened the windows of his room to capture a bat, then watched it rid the house of insects.

The book has flaws: lack of an index and skimpy margins that needlessly run the narrative almost off some pages. But rich in anecdotal text, adorned with superlative photographs, lustrously printed in Switzerland, it rates shelf space in any natural history library.

LILLIAN MOORE

The Sociology of the Absurd
Daniel Boorstin
(Simon & Schuster, $4.50)

This elaborate put-on deals with the outrageous theories of one "Professor X" who exposes a daring plan for a New Democracy. He reduces today's concern with ethnic education to the absurdity of providing every American with an Ethnic Quotient (E.Q.). Take, for example, the case of Patrick Fiorello Ginsburg. His E.Q. works out at J64:Med23:G13. This reflects an ancestry that is 64 percent Jewish, 23 percent Mediterranean and 13 percent Irish (*i.e.*, Gaelic).

Under Professor X's "School Disintegration Program," Pat would be entitled to spend 64 percent of his classroom hours with an instructor of Jewish ancestry, and so on. His extracurricular benefits would be similarly proportioned. Thus, nearly one-quarter of his school lunches would be of Mediterranean cookery which would "tend to alleviate the relatively high content of polyunsaturated fats found in salami, blintzes and other elements of 'J' cuisine."

Similarly, X suggests that every citizen be given a Merit Quotient (M.Q.) which would determine how much his ancestors have suffered. As the professor says, "persons who . . . were most disadvantaged in the past, must be specially privileged and advantaged in the present."

Professor Boorstin, new director of the Smithsonian Institution's Museum of History and Technology, says he has risked sanctions to make the X manuscript available. It seems calculated to bring faint, perhaps uncomfortable, smiles to academic faces.

PROFESSOR Y

Scene of Change
Warren Weaver (Scribners, $7.50)

Warren Weaver? The central fact of his life is the dominant part he played in the scientific benefactions of the Rockefeller Foundation for more than a quarter of a century. He tells the story modestly.

It is seldom indeed that we get a clear picture of the workings of great philanthropic foundations which play such a large part in American life today. Weaver's autobiography gives such a view.

Weaver recalls his development as a small-town boy entering a great university—Wisconsin—in 1912, when student life was *so* much simpler. He took his degree in civil engineering, but fell under the spell of mathematics. There were inspiring teachers at Wisconsin—Slichter, Dresden and the brilliant Max Mason, later to become president of the University of Chicago, and later still head of the Rockefeller Foundation.

It was Mason who called Weaver, in 1932, to forsake the happy faculty life at Wisconsin and join the Rockefeller Foundation as Director of the Division of Natural Sciences. This covered everything except medicine. Weaver, fresh from teaching math, took the job and began studying biological sciences to broaden his understanding.

After wartime service with Vannevar Bush, Weaver returned to Rockefeller and pushed the project of former Vice President Henry Wallace to increase crop yields in Mexico and so, "contribute . . . to the welfare of the country and the happiness of its people." By 1953, Weaver was concerned with improvements in rice—a major food for more

than two billion people. The Ford Foundation cooperated with the Rockefeller Foundation to create the International Rice Research Institute in the Philippines. Its effect is now felt throughout Asia.

After retirement at 65 (how ridiculous!) Weaver joined the staff of the Sloan Foundation and more recently has been working with the Salk Institute. His fine book is a record of forward-looking deeds, spelled out by the doer.

ARTHUR E. RUARK

The Mystery of Animal Migration
Matthieu Ricard, English verison by
Peter J. Whitehead (Hill & Wang, $5.95)

How does a Pacific golden plover navigate across 2,000 miles from Alaska to Hawaii? How does a salmon return after years to the stream where it was born?

Scientists have begun to answer some of these questions about migration, and in *The Mystery of Animal Migration* French biologist Matthieu Ricard distills the findings of hundreds of researchers.

- The gray whale sometimes uses a small iceberg as a pillow when he sticks his head out of the ocean to breathe.
- The different designs of arrowheads found stuck into storks captured in Europe have identified the tribal area where the birds nested in Africa.
- Geese have been recorded flying over 29,500-foot Dehra Dun in India.
- The tiny ruby-throated hummingbird flies the Gulf of Mexico non-stop.

Experiments show that many birds and fish navigate by the sun and birds by stars as well. In a few seconds these animals determine the correct course, taking into account time and rotation of stars. A human navigator with chronometer and sextant might take half an hour to make the same decision.

This is not a well-ordered book, but rather a collection of details about the movements of animals. It fails to present a general theory of migration. It poses unanswered questions on almost every page and ends with an unsolved mystery.

The book suffers from foolish anthropomorphisms: The woodland caribou "scorns the cold" while "scoffing at its relatives"; the little stint (a bird) displays "a feverish . . . disposition but is very self-assured."

ALAN TERNES

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Highlights

Arts and Industries Building: The Smithsonian's own one-pound piece of moon rock is on display surrounded by assorted space hardware, including a command module and a space suit. Also on view this month is Apollo Art, a show of 60 works by leading American painters on the subject of the lunar program. The White House Press Photographers Association is showing its annual award winners—65 photographs in a dozen categories.

National Museum of History and Technology: Laser 10 constitutes a special exhibition on the history and applications of laser technology during its first ten years. The collection of First Ladies' Gowns now includes Mrs. Nixon's inaugural gown. The Smithsonian Resident Puppet Theatre will introduce a new version of "Peter and the Wolf," starting April 4th.

National Museum of Natural History: The Armand Hammer Collection—a first exhibition of some 90 paintings, drawings and sketches—includes the works of Gauguin, Renoir, Matisse, Utrillo, Degas, as well as Rubens, Rembrandt, Sargent and Winston Churchill.

National Portrait Gallery: Charles Fenderich: The Washington Years is a collection of lithographs of the political figures and scenes of the Capitol during the mid-19th century.

National Collection of Fine Arts: The Massachusetts Institute of Technology presents Explorations. It includes a multimedia "information center" with slides, films and recorded sounds to give the viewer a sense of this nation and its art, and a "community of objects, environments and events."

Freer Gallery of Art: In addition to its fine collection of Oriental art, the museum is featuring a display of late Whistler paintings.

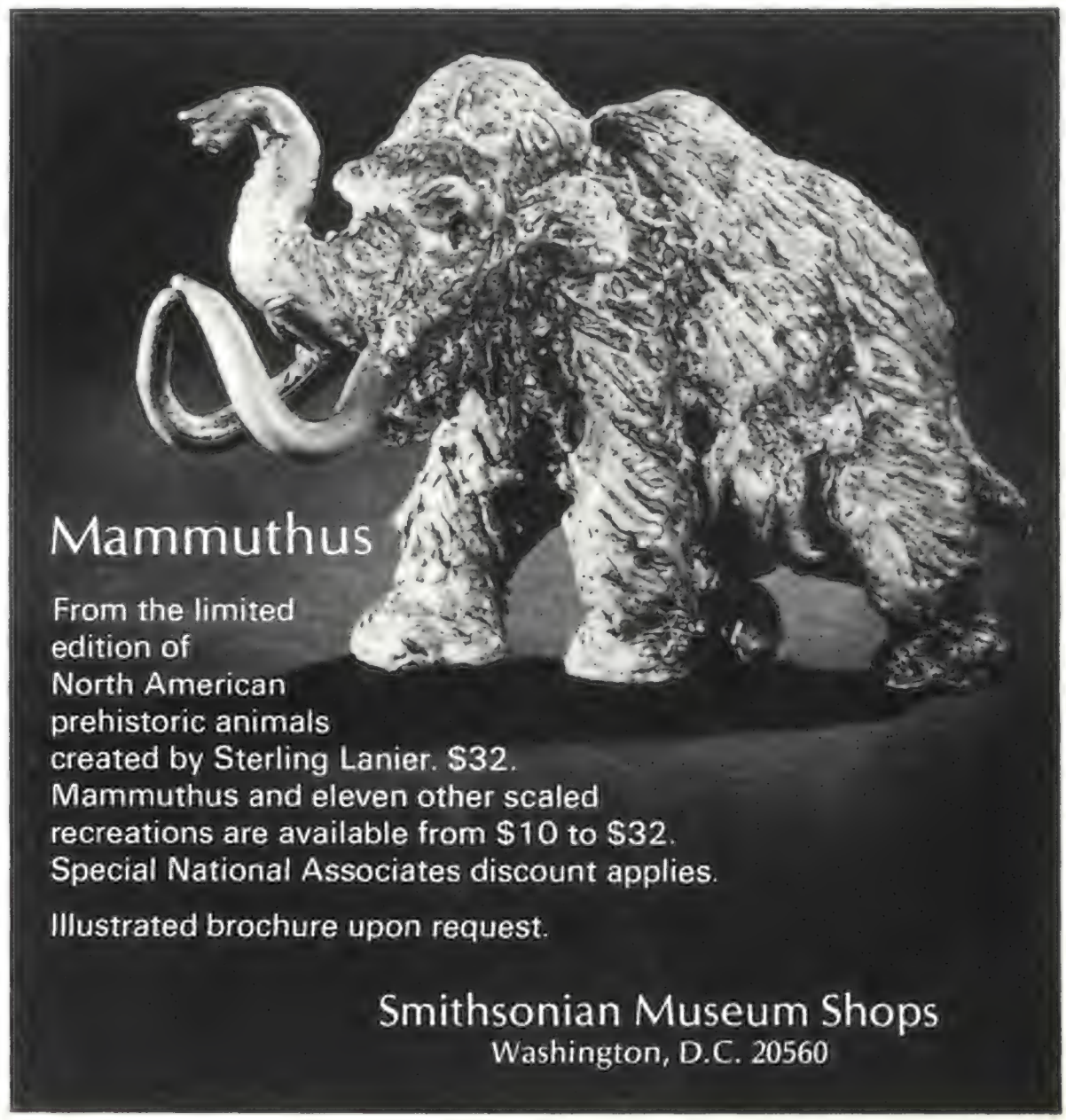
Cooper-Hewitt Museum of Decorative Arts and Design: This New York City museum's present exhibit is Contemporary Drawing, sponsored by the Drawing Society; it includes works by about 40 local artists, chosen by a committee of curators from New York museums.

Traveling Exhibition Service: A number of Smithsonian exhibitions will appear throughout the country. Some of the cities and the shows they will have are: Sarasota, Florida—The Work of Louis Soutter (Ringling Museum of Art through May 10th); Omaha, Nebraska—Georgian Country Houses (Joslyn Art Museum through May 17th); Phoenix, Arizona—From Bosporus to Samarkand (Phoenix Art Museum); Nashville, Tennessee—Plastic as Plastic (Tennessee Fine Arts Center); Buffalo, New York—The Concerned Photographer (Erie County Savings Bank from April 18th to May 17th).

Division of Performing Arts: The American College Theatre Festival will present ten of the best plays, chosen from those of 160 U.S. colleges, at George Washington University's new University Center Theater and at Ford's Theatre from April 27th through May 13th.

Smithsonian Museum Shops: The Arts and Industries Building will house Accoursi's ABC Circus from April 8th through June 30th. A large display of circus life, people and animals was created for the shop by William Accoursi, one of America's most inventive toymakers. Periodic special sales exhibitions are held in different shops.

On the Mall: The annual Kite Carnival, sponsored by the Smithsonian Associates and the National Air and Space Museum, will be held Saturday, April 4th.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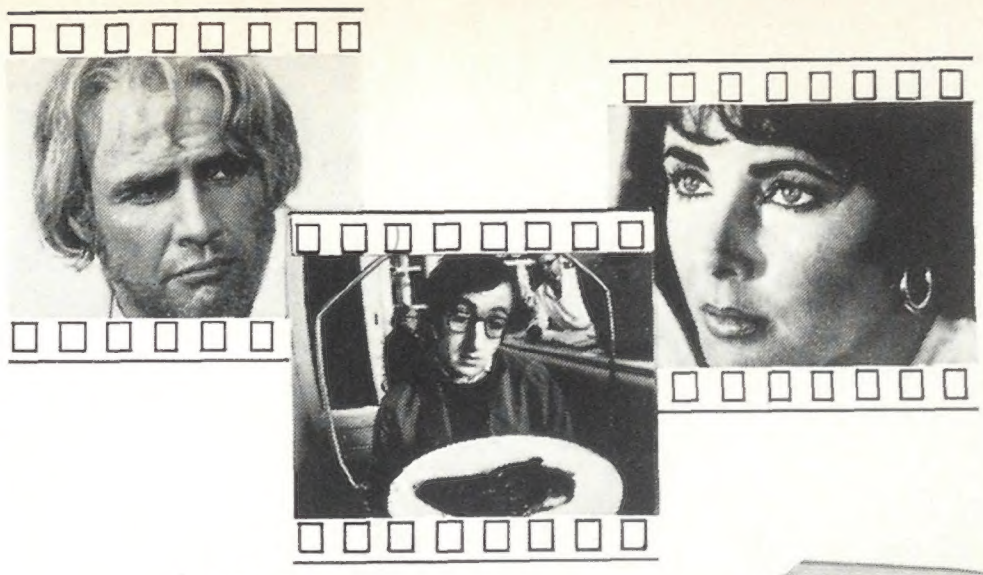

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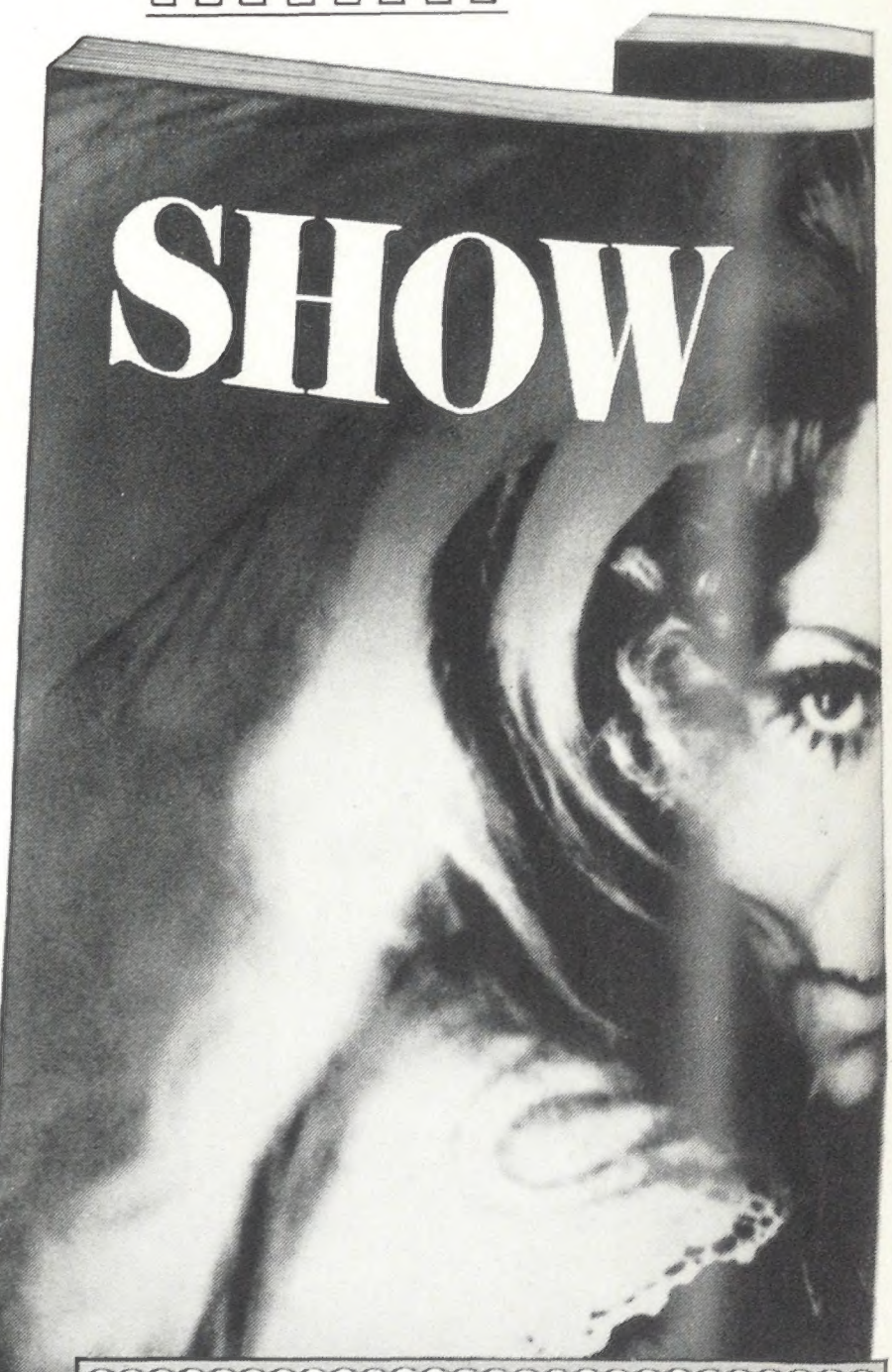
How America's top film editor *(Rachel, Rachel; Bonnie and Clyde; Alice's Restaurant)* separates the good from the ordinary with a scissors.

The man who loves Lana.
A thirty-year-old art director tells why he keeps 20,000 pictures of Lana Turner in his basement.

Shelley Plimpton: a girl for this season.
Scene-stealer in three hip hits—*Hair, Putney Swope* and *Alice's Restaurant*—Shelley is now starring in Jim McBride's story of the last two hippies alive.

Plus articles by and about: Jonathan Miller, Sir Laurence Olivier, Nicol Williamson, Robert Shaw, Fred Zinnemann, Dirk Bogarde, Robert Bolt, Francois Truffaut, Mike Nichols.



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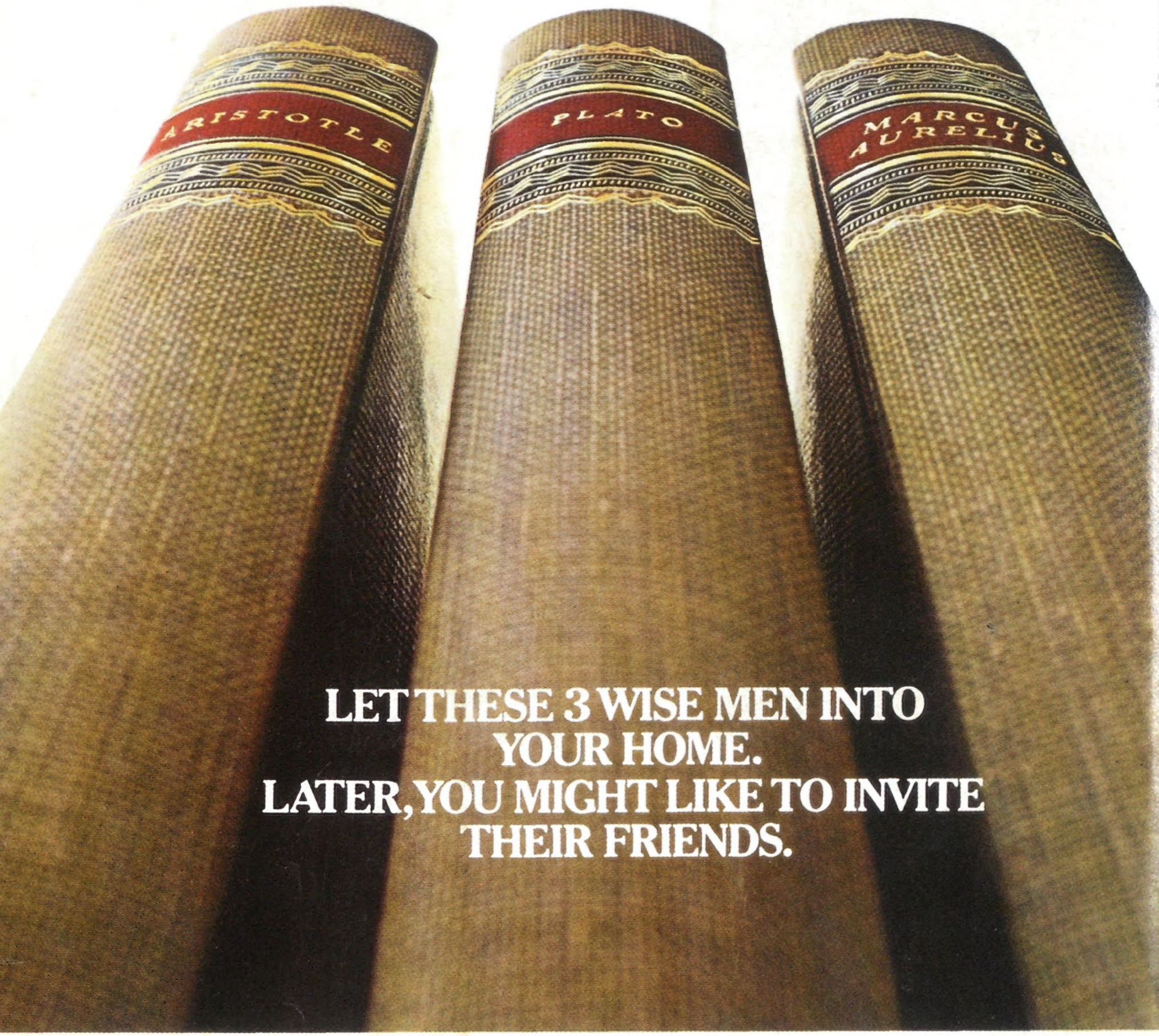

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